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REPORT FOR CONSULTATION ON THE SOUTHERN LOUISIANA-SOUTHEAST TEXAS INTERSTATE AIR QUALITY CONTROL REGION (LOUISIANA-TEXAS)

National Air Pollution Control Administration
Washington, D. C.

April 1970

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(LOUISIANA-TEXAS)

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Air Pollution Control Administration

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SECTION I

THE REGIONAL APPROACH TO AIR QUALITY AND A FEDERAL PROPOSAL FOR THE SOUTHERN LOUISIANA-SOUTHEAST TEXAS REGION

PREFACE

The Clean Air Act, as amended, directs the Secretary of Health, Education, and Welfare to designate "air quality control regions" to provide a basis for the adoption of regional air quality standards and the implementation of those standards. The Act stipulates that the designation of a region shall be preceded by consultation with appropriate State and local authorities. This report is intended to provide the basic background information needed for the consultation. It proposes boundaries for the Southern Louisiana-Southeast Texas Interstate Air Quality Control Region and discusses the factors which are the basis of the proposed boundaries.

The National Air Pollution Control Administration (NAPCA) recently established a new policy by which States may propose to the Federal Government boundaries for air quality control regions. The Texas Air Control Board was the first state agency to initiate proposals for region boundaries under the new policy when it developed reports for the Houston-Galveston, Dallas-Fort Worth, and San Antonio metropolitan areas. The Air Control Board, with assistance from NAPCA, has conducted a study of the Beaumont-Port Arthur-Orange metropolitan area, the results of which are presented in the body of this report.

The proposal for the Southern Louisiana portion of the region was developed by NAPCA with the cooperation of the Louisiana State Department of Health. The 39-parish study area was selected at the request of the Louisiana State Department of Health based upon their intimate knowledge to the total pollution problem in southern Louisiana.

The Region* boundaries proposed in this report remain subject to revisions suggested during consultation with State and local authorities. Formal designation of the Region will be made only after a careful review of all opinions and suggestions submitted during the consultation process.

The National Air Pollution Control Administration appreciates the assistance received from the States of Texas and Louisiana, and the local governments and planning agencies in the area.

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*For the purposes of this report, the word "region", when capitalized, will refer to the Southern Louisiana Intrastate Air Quality Control Region.

INTRODUCTION

THE REGIONAL APPROACH

Air pollution in the urban areas of the United States is a regional problem which frequently extends across governmental boundaries. Since air pollution problems are ~~rarely~~ usually confined to any single municipality ~~or~~ county, ~~and are often not confined within a single~~ State, successful control requires coordinated planning, standard setting, and enforcement by the several political jurisdictions which share a common problem. To date, State and local governments across the Nation have only begun to develop a regional approach to air pollution control.

The Clean Air Act, as amended, provides a regional approach which depends upon coordination and cooperation among all levels of government--municipal, county, State, and Federal. To set in motion the machinery for regional air pollution control, the Department of Health, Education, and Welfare designates air quality control regions (following consultation with State and local officials), issues air quality criteria, and publishes reports on control techniques. The designation of region boundaries indicates which State and local jurisdictions will be involved in a regional air pollution control effort. The air quality criteria indicate the extent to which various concentrations of air pollutants are harmful to health and damaging to property. The reports on control techniques provide information on the costs and effectiveness of various techniques for controlling air pollutant emissions.

After the Department of Health, Education, and Welfare completes these initial steps, State governments develop air quality standards and plans for implementation of such standards within the boundaries of designated air quality control regions. An air quality standard for a region defines the desired limit of concentration of a pollutant in its ambient air. It represents the level of air quality which the regional control program will attempt to achieve. An implementation plan is a blueprint of the steps which will be taken to attain chosen regional air quality standards within a reasonable time. The Clean Air Act requires that within 90 days after the Secretary of Health, Education, and Welfare has designated the region, State Governors must submit letters indicating that they intend to set air quality standards for those pollutants for which criteria and control technology documents have been issued. They have an additional 180 days to set the standards. The procedure for setting standards includes a public hearing which allows residents of a region to express their views concerning the proposed standards. The Governors are required to submit to the Secretary, within an additional 180 days, plans for the implementation of the standards which have been adopted.

The Department of Health, Education, and Welfare reviews air quality standards and implementation plans in order to ascertain their consistency with the provisions of the Act.

When air quality standards and implementation plans are approved, States proceed to prevent and control air pollution in accordance with those standards and plans. This system for establishing a regional approach to air pollution control is outlined in Figure 1.

DESIGNATION OF AIR QUALITY CONTROL REGIONS

Designation of an air quality control region is one of the first steps in the regional approach to air pollution control. Section 107 (a) (2) of the Clean Air Act, as amended, directs the Secretary, Department of Health, Education, and Welfare to make such designations. The portions of the section relevant to this discussion state:

> "...The Secretary, after consultation with appropriate State and local authorities shall...designate air quality control regions based on jurisdictional boundaries, urban-industrial concentrations, and other factors including atmospheric areas necessary to provide adequate implementation of air quality standards. The Secretary may...revise the designation of such regions...The Secretary shall immediately notify the Governor or Governors of the affected State or States of such designation."

Procedure for Designation of Regions

Figure 2 illustrates the procedures used by the National Air Pollution Control Administration (NAPCA) for designating air quality control regions.

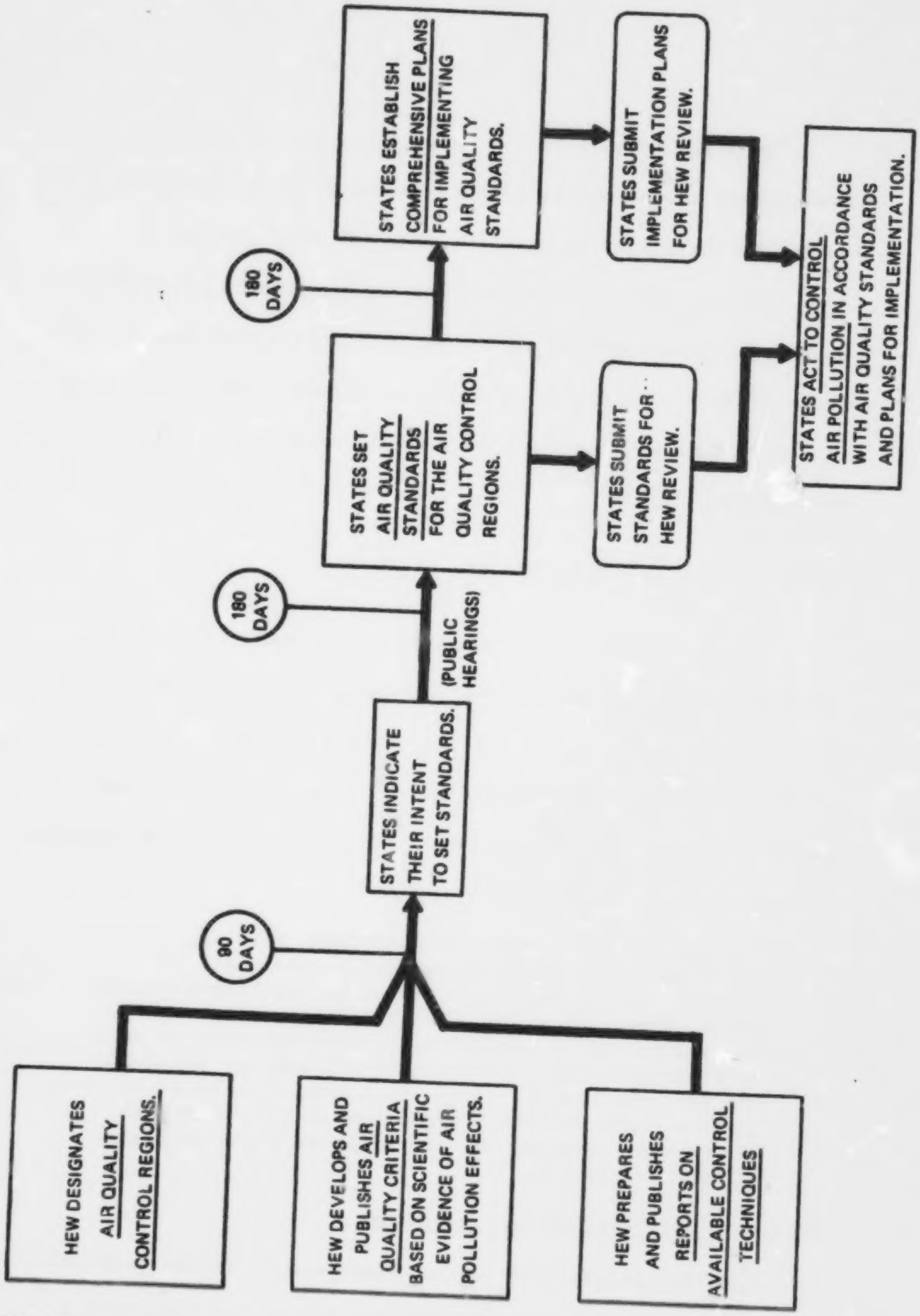

HEW DESIGNATES AIR QUALITY CONTROL REGIONS.
HEW DEVELOPS AND PUBLISHES AIR QUALITY CRITERIA BASED ON SCIENTIFIC EVIDENCE OF AIR POLLUTION EFFECTS.
HEW PREPARES AND PUBLISHES REPORTS ON AVAILABLE CONTROL TECHNIQUES
90 DAYS
STATES INDICATE THEIR INTENT TO SET STANDARDS.
(PUBLIC HEARINGS)
180 DAYS
STATES SET AIR QUALITY STANDARDS FOR THE AIR QUALITY CONTROL REGIONS.
STATES SUBMIT STANDARDS FOR HEW REVIEW.
180 DAYS
STATES ESTABLISH COMPREHENSIVE PLANS FOR IMPLEMENTING AIR QUALITY STANDARDS.
STATES SUBMIT IMPLEMENTATION PLANS FOR HEW REVIEW.
STATES ACT TO CONTROL AIR POLLUTION IN ACCORDANCE WITH AIR QUALITY STANDARDS AND PLANS FOR IMPLEMENTATION.

FIGURE 1 - Flow Diagram for Action to Control Air Pollution on a Regional Basis, Under the Air Quality Act

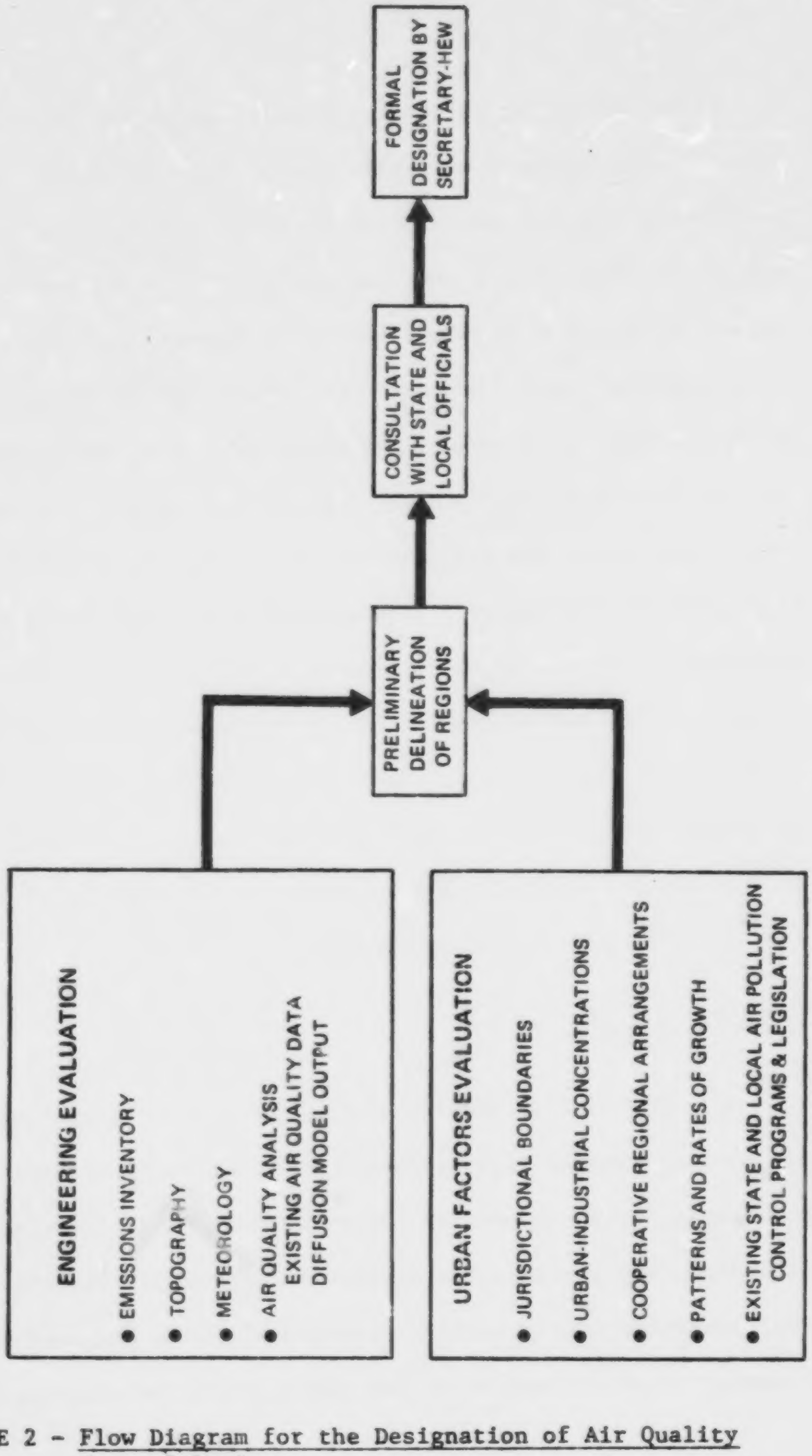

ENGINEERING EVALUATION
● EMISSIONS INVENTORY
● TOPOGRAPHY
● METEOROLOGY
● AIR QUALITY ANALYSIS
EXISTING AIR QUALITY DATA
DIFFUSION MODEL OUTPUT
URBAN FACTORS EVALUATION
● JURISDICTIONAL BOUNDARIES
● URBAN-INDUSTRIAL CONCENTRATIONS
● COOPERATIVE REGIONAL ARRANGEMENTS
● PATTERNS AND RATES OF GROWTH
● EXISTING STATE AND LOCAL AIR POLLUTION CONTROL PROGRAMS & LEGISLATION
PRELIMINARY DELINEATION OF REGIONS
CONSULTATION WITH STATE AND LOCAL OFFICIALS
FORMAL DESIGNATION BY SECRETARY-HEW

FIGURE 2 - Flow Diagram for the Designation of Air Quality Control Regions

After evaluating relevant technical and urban factors in a region, the National Air Pollution Control Administration publishes a proposed delineation of its boundaries. At the same time, NAPCA sets a time and place for a consultation meeting and distributes to State and local authorities a report of the evaluation study (such as this "Report for Consultation") which includes the boundary proposal. At the consultation meeting State and local authorities are encouraged to present fully their views and suggestions concerning the proposed boundaries of the region. Interested parties who do not have official status may submit comments in written form for the record. After careful review of all suggestions and opinions submitted for the record by interested parties, the Secretary of Health, Education, and Welfare makes a formal designation of the region boundaries and notifies the Governor(s) of the State(s) affected by the designation.

The Size of a Region

As stipulated in Section 107 (a) (2), the designation of air quality control regions should be based on "jurisdictional boundaries, urban-industrial concentrations, and other factors including atmospheric areas necessary to provide adequate implementation of air quality standards." This language suggests a number of objectives which are important in determining how large an air quality control region should be. Basically, these objectives can be divided into three separate categories.

First, a region should be self-contained with respect to air pollution sources and receptors. Unfortunately, since air pollutants can travel long distances, it is impractical if not impossible to delineate regions which are completely self-contained. The air over a region will usually have at least trace amounts of pollutants from external sources. During episodic conditions, such contributions from external sources may even reach significant levels. Conversely, air pollution generated within a region and transported out of it can affect external receptors to some degree. It would be impractical and inefficient to make all air quality control regions large enough to encompass these low-level trace effects. The geographic extent of trace effects overestimates the true problem area which should be the focus of air pollution control efforts. Thus, the first objective, that a region be self-contained, becomes a question of relative magnitude and frequency. The dividing line between "important influence" and "trace effect" will be a matter of judgment. The judgment should be based on estimates of the impact a source has upon a region, and the level of pollution to which receptors are subjected. In this respect, annual and seasonal data on pollutant emissions and ambient air concentrations are a better measure of relative influence than short term data on episodic conditions. In summary, a region should include most of the important sources in the area as well as most of the people and property affected by those sources.

The second general objective requires that regional boundaries be designed to meet not only present conditions but also future conditions. In other words, the region should include areas where industrial and residential expansion are likely to create air pollution problems in the foreseeable future. This objective requires careful consideration of existing metropolitan development plans, expected population growth, and projected industrial expansion. Such considerations should result in the designation of regions which will contain the sources and receptors of regional air pollution for a number of years to come. Of course, regional boundaries need not be permanently fixed, once designated. Boundaries should be reviewed periodically and altered when changing conditions warrant readjustment.

The third objective is that regional boundaries should be compatible with and even foster unified and cooperative governmental administration of the air resource throughout the region. Because air pollution usually extends across governmental boundaries, the cooperation of several governmental bodies is required for the solution of a common set of air pollution problems. In this regard, the established patterns of governmental cooperation on a range of urban problems is an important consideration, and the pattern of cooperation among existing air pollution control programs is a particularly relevant factor. In general, administrative considerations would argue against the division of governmental jurisdictions. Although it would be impractical to preserve State jurisdictions undivided, usually it is possible to preserve the unity of county governments by including or excluding them in their entirety. Occasionally, even this would be impractical due to a county's large size, wide variation in level of development, or striking topographical features.

To the extent that any two of the above three objectives lead to incompatible conclusions concerning region boundaries, the region must represent a reasonable compromise. A region should represent the best way of satisfying the three objectives simultaneously.

As noted above, the evaluations of relevant technical, urban, and governmental factors form the basis of the boundary proposals published by NAPCA. The technical factors study takes account of the location of pollution sources and the geographic extent of serious pollutant concentrations in the ambient air. Pollution sources are identified through an inventory of emissions from power generation, industrial operations, space heating, waste disposal, and other pollution-causing activities. The transport and distribution of pollutants in the ambient air are analyzed on the basis of measured air quality data, the location of emissions, meteorological data, and topographic information. A mathematical diffusion model which predicts ambient pollution concentrations from information on emissions and meteorology can be used in areas where irregular topographical features would not invalidate the theoretical model. As a whole, the technical factors study indicates how large the air quality control region should be in order to encompass most pollution sources and most people and property affected by those sources.

The study of urban factors takes account of a different set of considerations. It discusses the location of urban and industrial concentrations and expected patterns of urban growth. As a whole, the urban factors study indicates how large a region should be in order to encompass expected regional growth.

The evaluation of the regional governmental organizations discusses the planning agencies, councils of government, and state and local air pollution control programs. This study attempts to define the combination of Parishes which, through cooperative regional arrangements, would best work together towards achieving clean air in the region.

The body of this report contains a proposal for the Southern Louisiana - Southeast Texas Interstate Air Quality Control Region, following evaluation of technical, urban, and governmental factors. The report is intended to serve as the background document for the formal Consultation between the National Air Pollution Control Administration and the appropriate State and local authorities.

THE FEDERAL PROPOSAL FOR THE SOUTHERN LOUISIANA-SOUTHEAST TEXAS AIR QUALITY CONTROL REGION

Subject to the scheduled consultation, the Secretary, Department of Health, Education, and Welfare, proposes to designate an air quality control region for the southern Louisiana-southeast Texas area, consisting of the territory encompassed by the following jurisdictions:

In the State of Louisiana:

Acadia Parish
Allen Parish
Ascension Parish
Assumption Parish
Avoyelles Parish
Beauregard Parish
Calcasieu Parish
Cameron Parish
East Baton Rouge Parish
East Feliciana Parish
Evangeline Parish
Grant Parish
Iberia Parish
Iberville Parish
Jefferson Parish
Jefferson Davis Parish
Lafayette Parish
Lafourche Parish
Livingston Parish
Orleans Parish
Plaquemines Parish
Pointe Coupee Parish
Rapides Parish
St. Bernard Parish
St. Charles Parish
St. Helena Parish
St. James Parish
St. John the Baptist Parish
St. Landry Parish
St. Martin Parish
St. Mary Parish
St. Tammany Parish
Tangipahoa Parish
Terrebonne Parish
Vermilion Parish
Vernon Parish
Washington Parish
West Baton Rouge Parish
West Feliciana Parish

In the State of Texas:

Hardin County
Jasper County
Jefferson County
Newton County
Orange County

The proposed boundaries, illustrated in Figure 3, encompass the recommendation by the State of Texas presented in Section II

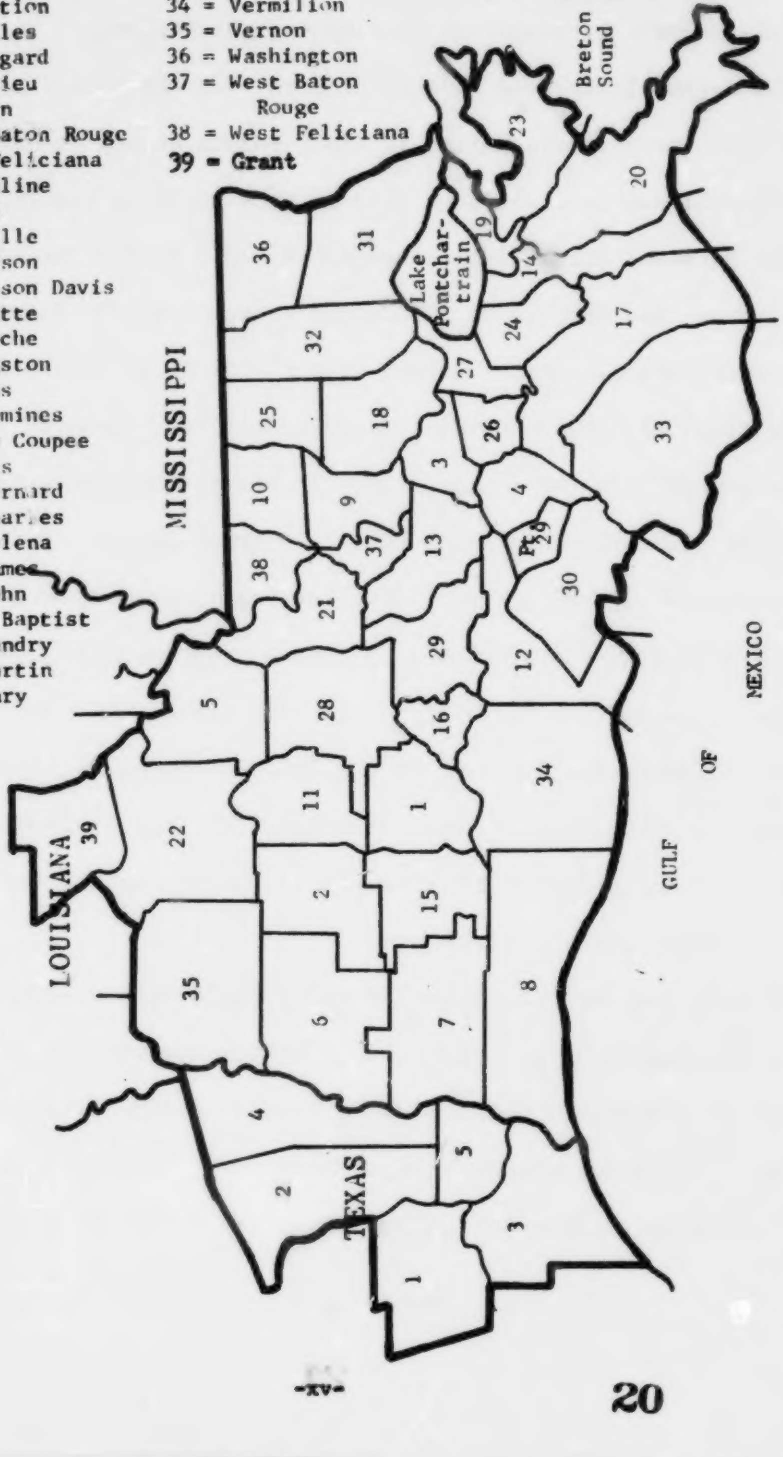
FIGURE 3. PROPOSED BOUNDARIES FOR THE SOUTHERN LOUISIANA-SOUTHEAST TEXAS AIR QUALITY CONTROL REGION.

LOUISIANA
PARISH IDENTIFICATION CODE

1 = Acadia
2 = Allen
3 = Ascension
4 = Assumption
5 = Avoyelles
6 = Beauregard
7 = Calcasieu
8 = Cameron
9 = East Baton Rouge
10 = East Feliciana
11 = Evangeline
12 = Iberia
13 = Iberville
14 = Jefferson
15 = Jefferson Davis
16 = Lafayette
17 = Lafourche
18 = Livingston
19 = Orleans
20 = Plaquemines
21 = Pointe Coupee
22 = Rapides
23 = St. Bernard
24 = St. Charles
25 = St. Helena
26 = St. James
27 = St. John the Baptist
28 = St. Landry
29 = St. Martin
30 = St. Mary
31 = St. Tammany
32 = Tangipahoa
33 = Terrebonne
34 = Vermilion
35 = Vernon
36 = Washington
37 = West Baton Rouge
38 = West Feliciana
39 = Grant

TEXAS
COUNTY IDENTIFICATION CODE

1 = Hardin
2 = Jasper
3 = Jefferson
4 = Newton
5 = Orange


Breton Sound
Lake Pontchartrain
MISSISSIPPI
LOUISIANA
TEXAS
GULF OF MEXICO
23
20
19
14
31
36
32
24
17
27
25
18
26
33
3
10
9
4
37
13
Pt.
29
38
30
21
29
12
5
28
16
11
1
34
39
22
2
15
35
6
7
8
4
5
2
3
1

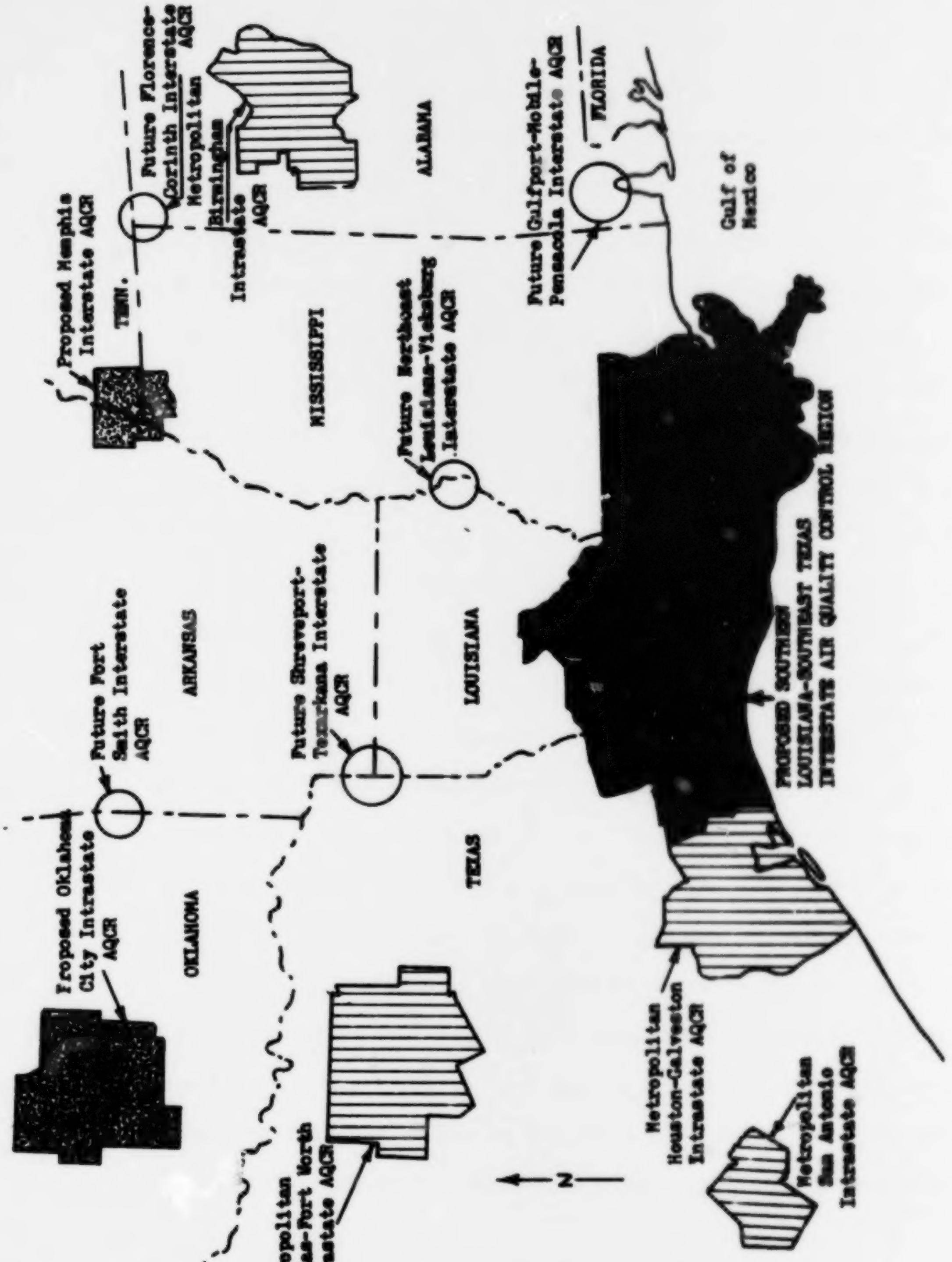
of this report, and a 39-parish area in southern Louisiana, described in Section III. Figure 4 locates the Region in relation to remainder of Texas and Louisiana, the surrounding states, and existing and proposed air quality control regions.

The rationale for the Federal proposal for the Louisiana portion of the proposed Region is described in detail in Section III and will not be elaborated upon at this point in the report.

The National Air Pollution Control Administration has reviewed the proposal and supportive discussion prepared by the Texas Air Control Board. NAPCA concurs with the findings of the Board and proposes to include Hardin, Jasper, Jefferson, Newton, and Orange counties in the Texas portion of the Southern Louisiana-Southeast Texas Interstate Air Quality Control Region. Most pollution sources and receptors are located in two of the five counties--Jefferson and Orange. All five counties were shown to have potential for industrial expansion during the next fifteen years. A population forecast of 178,000 additional residents for the five-county area further substantiates the conclusion on the need for a region large enough to provide protection against future pollution problems.

The National Air Pollution Control Administration encourages the establishment of air quality control regions which correspond to, or are compatible with, State or locally defined planning regions. The Texas proposal for a five-county region in Southeast Texas includes one complete planning region, Southeast Texas,

FIGURE 4. RELATIONSHIP OF PROPOSED SOUTHERN LOUISIANA-SOUTHEAST TEXAS INTERSTATE AIR QUALITY CONTROL REGION TO SURROUNDING AREAS.


Proposed Oklahoma City Intrastate AQCR
OKLAHOMA
TEXAS
Future Fort Smith Interstate AQCR
ARKANSAS
Future Shreveport-Texarkana Interstate AQCR
LOUISIANA
PROPOSED SOUTHERN LOUISIANA-SOUTHEAST TEXAS INTERSTATE AIR QUALITY CONTROL REGION
Future Northeast Louisiana-Vicksburg Interstate AQCR
MISSISSIPPI
Proposed Memphis Interstate AQCR
TENN.
Future Florence-Corinth Interstate AQCR
Metropolitan Birmingham Intrastate AQCR
ALABAMA
Future Gulfport-Mobile-Pensacola Interstate AQCR
FLORIDA
Gulf of Mexico
Metropolitan Dallas-Fort Worth Intrastate AQCR
Metropolitan Houston-Galveston Intrastate AQCR
Metropolitan San Antonio Intrastate AQCR
N

and three counties of another region, the Deep East Texas Development Council. Consideration should be given at the Consultation to possible inclusion of the remaining counties of this planning region in the proposed air quality control region.

The Federal proposal is an interstate region in the southern Louisiana-southeast Texas area. The interstate Region is a combination of two previously announced regions centered about (1) New Orleans, Louisiana, and (2) Beaumont-Port Arthur, Texas. The initial studies of these two regions centered on the New Orleans-Baton Rouge corridor and the Beaumont-Port Arthur, Texas--Lake Charles, Louisiana core areas. Further study of the New Orleans-Baton Rouge area, however, revealed that urbanization and industrialization had no distinct demarcation line at its western edge. The details of this consequence are presented in Section III of this report.

Several other study findings support the conclusions for an interstate region proposal. Transportation linkages, such as Interstate-10 and U.S.-190, tie the Beaumont-Port Arthur area of Texas with the major metropolitan areas of southern Louisiana. Higher population densities, which are apparent when examining the data presented later in this report, coincide with these same transportation corridors. An important consideration for developing boundaries for a proposed region--enclosing a common source-receptor area--is supported by the fact that five separate Standard Metropolitan Statistical Areas are included in the area.

Thus, the administration of a successful air pollution control program for the area would be simplified by one region rather than five separate regions. An interstate region will encourage intergovernmental cooperation and coordination throughout this area of common air pollution problems. Finally, the interstate area has similar topography and meteorology.

In recognition of the intergovernmental problems inherent in the control of air pollution, the National Air Pollution Control Administration has placed highest priority on interstate regions. Recently, 34 additional areas were announced for designation as interstate air quality control regions by the end of summer, 1970. Two of these areas are immediately adjacent to the proposed Southern Louisiana-Southeast Texas Air Quality Region.

After reviewing these factors on the interstate character of the Region and the added emphasis at the Federal level on intergovernmental cooperation, the Region proposed in this report is considered on the whole to be the most cohesive and yet inclusive area within which an effective regional effort can be mounted to prevent and control air pollution in the southern Louisiana-southeast Texas area.

SECTION II

ANALYSIS AND PROPOSAL FOR THE TEXAS PORTION OF THE SOUTHERN LOUISIANA-SOUTHEAST TEXAS REGION BY THE STATE OF TEXAS

EVALUATION OF URBAN FACTORS

INTRODUCTION

A number of urban factors are relevant to the problems of defining the boundaries of air quality control regions. These factors include the location of population and industry, the population density, projected growth of both population and industry, and jurisdictional considerations. These are all important considerations since human activity is the initial cause of most air pollution. Humans are also the receptors affected by the pollution. Projected growth patterns are important for future planning purposes.

HISTORY

The history of the Jefferson-Orange Region is centered around the three major cities: Beaumont, the county seat of Jefferson County; Port Arthur, also in Jefferson County; and Orange, the county seat of Orange County.

The history of Beaumont and the surrounding area dates back to the late seventeenth century when the French explorer, de la Salle, is believed to have visited the area. The first white settlers came to Beaumont in the 1800's and in 1837 the original townsite was established. A sawmill town of less than 10,000 people, Beaumont was skyrocketed to fame in January 1901, when the famous Lucas gusher "blew in" at Spindletop, a few miles south of the present city limits. This marked the birth of the oil industry in Texas and fostered the industrial and commercial activity which has continually increased until the present.

Port Arthur is named after Arthur E. Stilwell, a Kansas City financier, who built the Kansas City-Pittsburg and Gulf Railroad to Port Arthur in 1899. This marked the birth of the expansion of the entire area. Two years after the deep-water canal to the Gulf was completed the Spindletop oil discovery was made, adding to the area's growing economy.

Orange came into existence in 1836 when boatmen navigating the Sabine noticed natural orange groves on the river bank. Orange, a major link between Texas and Louisiana, took a stride forward in 1914 when a harbor was dredged to accommodate ocean-going vessels. During World War II, Orange became a boom town overnight because of its shipbuilding facilities.

POPULATION DISTRIBUTION AND PROJECTIONS[5]

Figures 1, 2, 3, 4 show population density and projections for Orange and Jefferson counties for 1960 to 1985. The 1970 population for Jefferson and Orange counties is estimated to be 415,000 with projections of 575,000 by 1986. Figure 2 indicates population figures for the period 1890 to 1970. Jefferson County's growth rate of 26% for the period 1950 to 1960 makes it one of the fastest growing areas in the State of Texas. Figure 3 indicates this same strong growth pattern for Orange County. The population figures for Newton, Jasper, and Hardin counties which are primarily rural are shown in Table 1.[6]

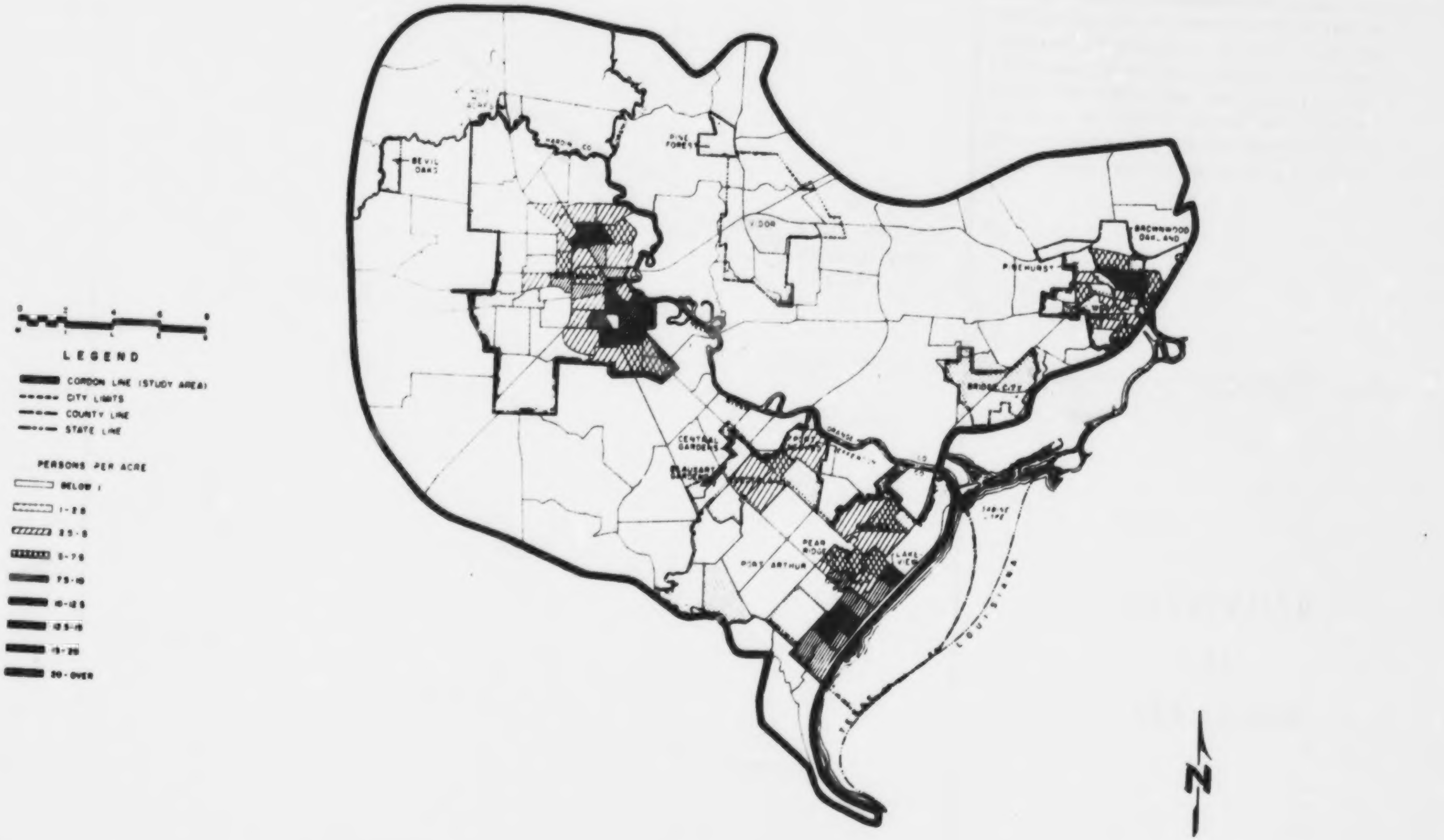

LEGEND
CORDON LINE (STUDY AREA)
CITY LIMITS
COUNTY LINE
STATE LINE
PERSONS PER ACRE
BELOW 1
1-2.5
2.5-5
5-7.5
7.5-10
10-12.5
12.5-15
15-20
20-OVER
BEVIL OAKS
HARDIN CO.
PINE FOREST
VIDOR
PINEHURST
BRIDGE CITY
CENTRAL GARDENS
PEAR RIDGE
PORT ARTHUR
LAKE VIEW
SABINE LAKE
LOUISIANA
N

Figure 1

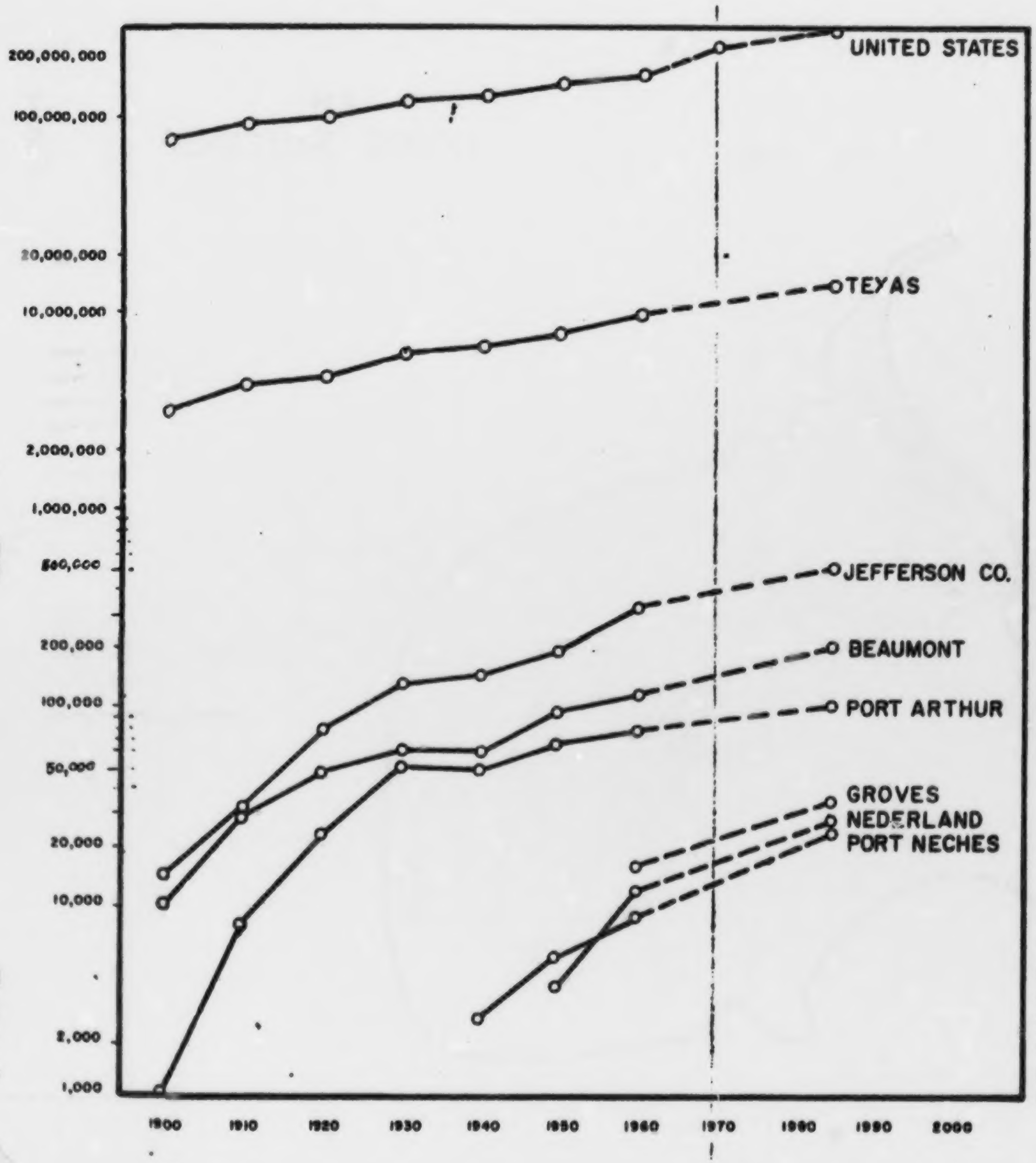
POPULATION DENSITY
1960

Study Area

JEFFERSON - ORANGE

REGIONAL TRANSPORTATION STUDY

PROJECTION
OF
POPULATION



Jefferson County Area

SOURCE: 1900-1960, U.S. BUREAU OF THE CENSUS, 1970 AND 1985 U.S. POPULATION PROJECTIONS, U.S. BUREAU OF THE CENSUS, POPULATION ESTIMATES, SERIES P-25, NUMBER 286. 1970 AND 1985 STATE POPULATION PROJECTIONS, BUREAU OF BUSINESS RESEARCH, THE UNIVERSITY OF TEXAS. 1970-1985 REGIONAL POPULATION PROJECTIONS, JEFFERSON ORANGE REGIONAL TRANSPORTATION STUDY.

Figure 2

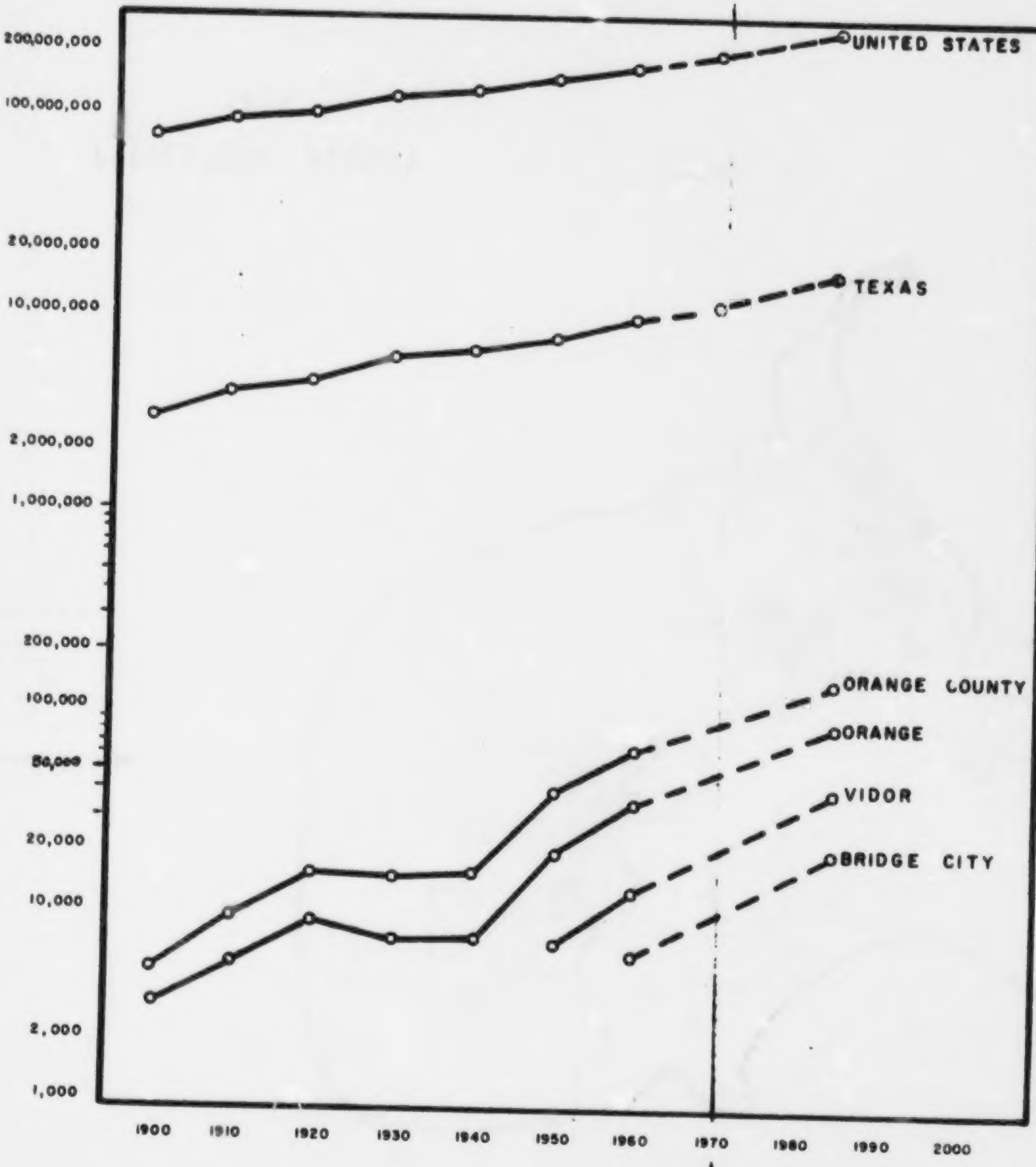
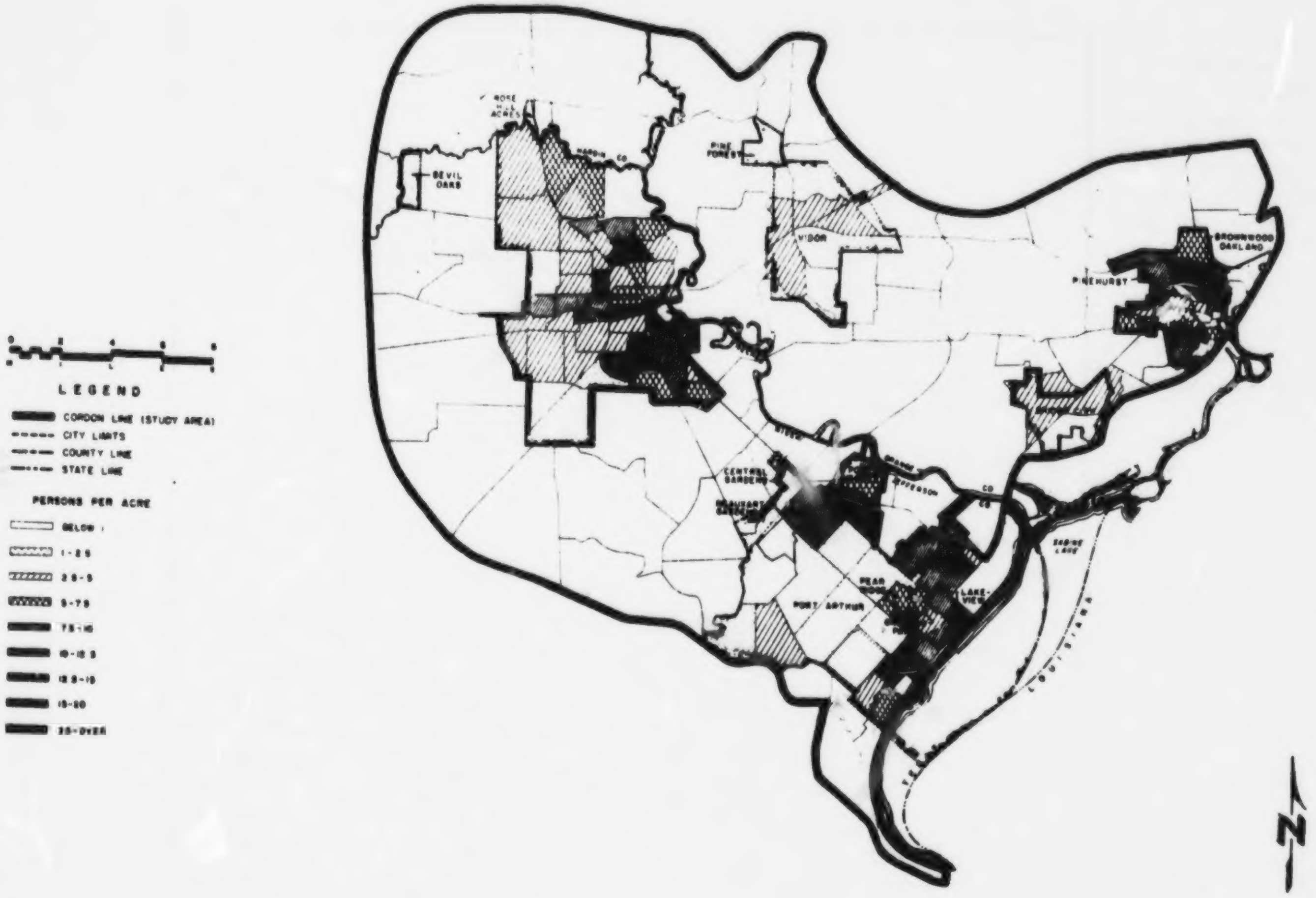


Figure 3

PROJECTION
OF
POPULATION

Orange County Area

SOURCE: 1900-1960, U.S. BUREAU OF THE CENSUS, 1970 AND 1985 U.S. POPULATION PROJECTIONS, U.S. BUREAU OF THE CENSUS, POPULATION ESTIMATES, SERIES P-25, NUMBER 286 1970 AND 1985 STATE POPULATION PROJECTIONS, BUREAU OF BUSINESS RESEARCH, THE UNIVERSITY OF TEXAS 1970-1985 REGIONAL POPULATION PROJECTIONS, JEFFERSON ORANGE REGIONAL TRANSPORTATION STUDY.


LEGEND
CORDON LINE (STUDY AREA)
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BELOW 1
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5-7.5
7.5-10
10-12.5
12.5-15
15-20
20-OVER
ROSE HILL ACRES
BEVIL OAKS
HARDIN CO
PINE FOREST
VIDOR
PINEHURST
BROWNWOOD OAKLAND
CENTRAL GARDENS
PORT ARTHUR
PEAR RIDGE
LAKEVIEW
JEFFERSON
CO
SABINE LAKE
LOUISIANA
N

POPULATION DENSITY

1985

Study Area

JEFFERSON - ORANGE

REGIONAL TRANSPORTATION STUDY

Figure 4

BEAUMONT, TEXAS

POPULATION

Year	BEAUMONT Pop.	BEAUMONT %Incr.	PORT ARTHUR Pop.	PORT ARTHUR %Incr.	JEFFERSON CO. Pop.	JEFFERSON CO. %Incr.	BEAUMONT SMSA*** Pop.	BEAUMONT SMSA*** %Incr.
1890	3,296				5,857		10,627	
		186%				143%		88%
1900	9,427		900		14,239		20,144	
		119%		751%		168%		138%
1910	20,640		7,663		38,182		47,410	
		96%		190%		88%		85%
1920	40,422		22,251		73,120		88,499	
		43%		129%		82%		68%
1930	57,732		50,902		133,391		148,540	
		2%		-9%		9%		10%
1940	59,061		46,140		145,329		162,711	
		59%		25%		34%		45%
1950	94,014		57,530		195,083		235,650	
		26.8%		15.9%		25.9%		30%
1960	119,175		66,676		245,659		306,016	
1/1/69	136,400*		69,700*		266,100*		336,100*	
1970	150,000**				320,000**		395,600**	

*Estimated with reference to SALES MANAGEMENT MAGAZINE, June 10, 1969.

**"Population Projections for Texas Standard Metropolitan Statistical Areas, 1970", Texas Business Review, March 1962, page 63.

***Beaumont Standard Metropolitan Statistical Area is constituted of Jefferson and Orange Counties; Beaumont is County Seat of Jefferson County; Port Arthur is in Jefferson County South.

PER CENT POPULATION INCREASES

Year 1960 over 1950

United States	+18.5%
State of Texas	+24.3%
Jefferson County	+25.9%
Beaumont, Texas	+26.8%

SOURCE: U. S. Department of Commerce, Bureau of the Census except as noted.

Prepared by: Chamber of Commerce
P. O. Box 3150
Beaumont, Texas 77704
713-838-6581

Table 1

1970

TABLE 2

POPULATION AND PROJECTED POPULATION OF ORANGE AND ORANGE COUNTY, TEXAS

	ORANGE			ORANGE COUNTY	
YEAR	POPULATION	PERCENT CHANGE	PERCENT OF COUNTY POPULATION	POPULATION	PERCENT CHANGE
1890	3,173	N.A.	66.5	4,770	62.4
1900	3,835	20.7	64.9	5,905	23.7
1910	5,527	44.1	58.0	9,528	61.4
1920	9,212	66.7	59.9	15,379	61.4
1930	7,913	-14.2	52.2	15,149	- 1.5
1940	7,472	- 5.6	42.9	17,382	14.7
1950	21,174	183.3	52.2	40,567	133.4
1960	25,605	20.9	42.2	60,357	48.8
1968	29,570*	15.5	40.6	72,900**	20.7
1970	34,368	34.2	48.0	71,601	18.6
1980	43,079	25.3	52.0	82,845	15.7
1990	52,689	22.3	56.0	94,089	13.6

* A ratio was established between 1960 electric, water and gas connections as compared with the number of connections for these same utilities as of December 31, 1968. Individual estimates using each type of utility connections were electrical - 29,745, water - 27,823, and gas - 31,144. The average of these figures is 29,570.

** Population Research Center, Department of Sociology, The University of Texas at Austin, Austin, Texas.

SOURCE: 1890-1960 U. S. Census of Population, Bureau of the Census, U. S. Department of Commerce, Washington, D. C.

1970-1990 Industrial Economics Research Division, Texas A&M University, College Station, Texas.

Table 3

Population by Counties

	1900	1910	1920	1930	1940	1950	1960
Newton Co.	7,282	10,850	12,196	12,524	13,700	10,382	10,372
Jasper Co.	7,138	14,000	15,569	17,064	17,491	20,049	22,100
Hardin Co.	5,049	12,974	15,983	13,936	15,875	19,535	24,629

These counties are expected to remain primarily rural, except at their southern boundaries where the metropolitan Orange-Beaumont areas will begin to expand into these three counties.

The five county area is projected to have about 650,000 people by 1985.

AREA ECONOMY

Initially the economy of the Jefferson-Orange Region relied on the export of cotton, lumber, and cattle. After the discovery of the Lucas Gusher at Spindletop in 1901, the petroleum industry began to flourish. Soon thereafter came improvements to the deep-water ports at Beaumont, Port Arthur, and Orange, making the cities major shipping ports on the Gulf Coast. During World War II the region became a major petroleum refining and petro-chemical manufacturing center.

The population growth of the Jefferson-Orange area has closely paralleled the great industrial development of the area throughout the past 50 years.

Agricultural Industries

The leading agricultural industries in the Jefferson-Orange area are rice, lumber, and cattle. Rice is the most important agricultural crop in the coastal counties. Other crops grown include vegetables, sorghums, cotton, pears, oranges, peaches, and figs. The pecan is the main nut crop produced commercially. The total value of agricultural products produced in 1959 in Jefferson and Orange counties was estimated at $13,000,000.[7] In Jefferson and Orange counties agricultural acreage is expected to decline in the future because of increased urbanization.

Non-Agricultural Industries

Production and processing of oil, natural gas, sulfur and salt are the most important non-agricultural industries in the five county area. On January 10, 1901 the Lucas gusher at Spindletop was completed. It was the first oil well in the area and at that time the largest oil well on the American continent. From 1901 until after World War II, petroleum, shipbuilding and metal fabrication were the dominant industries. Since World War II the major industries in the Jefferson-Orange area have been petroleum refining, petro-chemical processing and related activities. Metal fabrication, shipbuilding and the manufacture of paper products are also important to the economic base of the area. The value of mineral production in Jefferson and Orange counties was $82,000,000 in 1962.

The Jefferson-Orange area is one of the nine major manufacturing regions in the State of Texas.[8] The study area is served by a vast complex of pipelines, waterways, railroads, and highways. The basic manufacturing industries and their relative importance to the area are shown in Table 4.

Industrial expansion is expected to continue because of the availability of raw materials, an adequate supply of labor, and the proximity of the study area to the Gulf of Mexico. See Figure 5 , "Land Use Forecast Map--Jefferson and Orange Counties, 1985."

JURISDICTIONAL BOUNDARIES

In Texas, the County is the basic political-jurisdictional boundary unit. For this reason, it is best to include a whole county within the region, even though only a portion of a county might be affected by a regional air pollution problem. In operating the regional air control agency, this consideration can be taken into account and different parts of a county can be controlled differently from an air control standpoint.

REGIONAL PLANNING

The Office of the Governor, Division of Planning Coordination, has designated Jefferson and Orange counties as the "South East Texas Planning Region." At the present time there exists the "Orange County Council of Governments." Orange and Jefferson counties are considering establishing a two county Council of Governments. There also exists the thirteen county "Deep East Texas Development Council" which includes Hardin, Jasper, and Newton counties.

TABLE 6

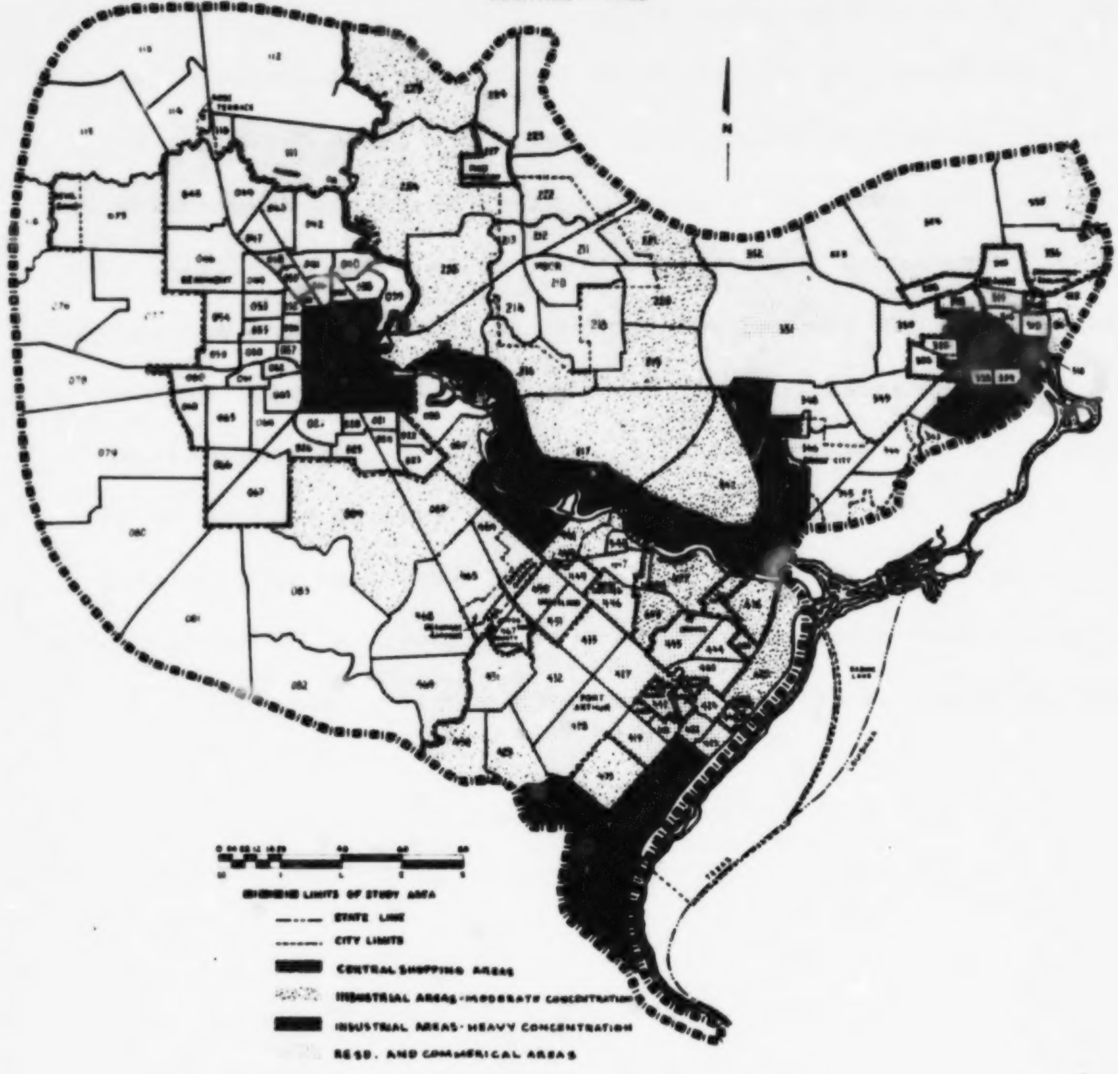
NUMBER OF PLANTS AND EMPLOYEES BY STANDARD INDUSTRIAL CLASSIFICATION IN THE JEFFERSON-ORANGE REGION

	STANDARD INDUSTRIAL CLASSIFICATION	No. of Plants*	No. of Employees**
13	Products Recoverd from Natural Gas	2	32
20	Food and Kindred Products	36	1,063
22	Textile Mill Products	1	16
23	Apparel and Other Finished Products Made from Fabrics and Similar Materials	5	47
24	Lumber and Wood Products, except Furniture	12	425
25	Furniture and Fixtures	14	166
26	Paper and Allied Products	5	955
27	Printing and Allied Products	26	1,543
28	Chemicals and Allied Products	26	10,922
29	Petroleum Refining and Related Industries	9	14,090
30	Rubber and Miscellaneous Plastic Products	2	21
32	Stone, Shell, Clay and Glass Products	19	604
33	Primary Metal Industries	8	712
34	Fabricated Metal Products, except Ordnance, Machinery, and Transportation Equipment	43	6,335
35	Machinery, except Electrical	21	1,688
36	Electrical and Electronic Machinery Equipment and Supplies	4	80
37	Transportation Equipment	9	2,078
38	Professional, Scientific, and Controlling Instruments; Photographic and Optical Goods; Watches and Clocks	2	80
39	Miscellaneous Manufacturing Industries	9	97

*Texas Directory of Manufacturers, 1964, Bureau of Business Research, The University of Texas, Austin, Texas

**Industrial Economics Research Division, Texas A & M University, College Station, Texas.

LAND USE FORECAST MAP — JEFFERSON AND ORANGE COUNTIES — 1985


N
BEAUMONT
PORT ARTHUR
LIMITS OF STUDY AREA
STATE LINE
CITY LIMITS
CENTRAL SHOPPING AREAS
INDUSTRIAL AREAS-MODERATE CONCENTRATION
INDUSTRIAL AREAS-HEAVY CONCENTRATION
RESD. AND COMMERICAL AREAS

SOURCE: INDUSTRIAL ECONOMICS RESEARCH DIVISION

Figure 5

EXISTING AIR CONTROL AGENCIES

The Texas Air Control Board is the State agency responsible for air pollution control activities. The Texas Clean Air Act provides for equal enforcement of State Rules and Regulations by local governments (cities, counties, and health districts). The State Board has adopted regulations relating to smoke and suspended particulate matter, outdoor burning, sulfur compounds, automobile emissions, and toxic materials. Enforcement provisions allow both injunctive relief and civil and criminal penalty of up to $1000 per day. Within the five-county study area an organized local control program is presently functional in Jefferson County. Orange County is currently organizing a control program.

EVALUATION OF ENGINEERING FACTORS

INTRODUCTION

The engineering evaluation for the Beaumont-Port Arthur-Orange area was based on a study of topography, air pollutant emissions, meteorology, estimated air quality levels, and available air quality data. The emission inventory indicated the location of point and area sources and the quantity of pollutants emitted from these sources. Emission densities were calculated from the emission quantities and grid areas. Emissions and average meteorological data were used in a diffusion model to estimate air quality levels. Figure 6 shows the Beaumont-Port Arthur-Orange metropolitan area in relation to other metropolitan areas. Figure 7 is a more detailed map of the five county study area.

The study region covers two of the twenty-one major metropolitan areas in the State of Texas. Beaumont-Port Arthur-Orange is locally known as the Golden Triangle area--a highly industrialized area but significantly agricultural. Hardin, Jasper, and Newton counties are primarily rural with timber and wood industries being a main economic factor.

Geographical Location of BEAUMONT-PORT ARTHUR-Orange METROPOLITAN STUDY AREA

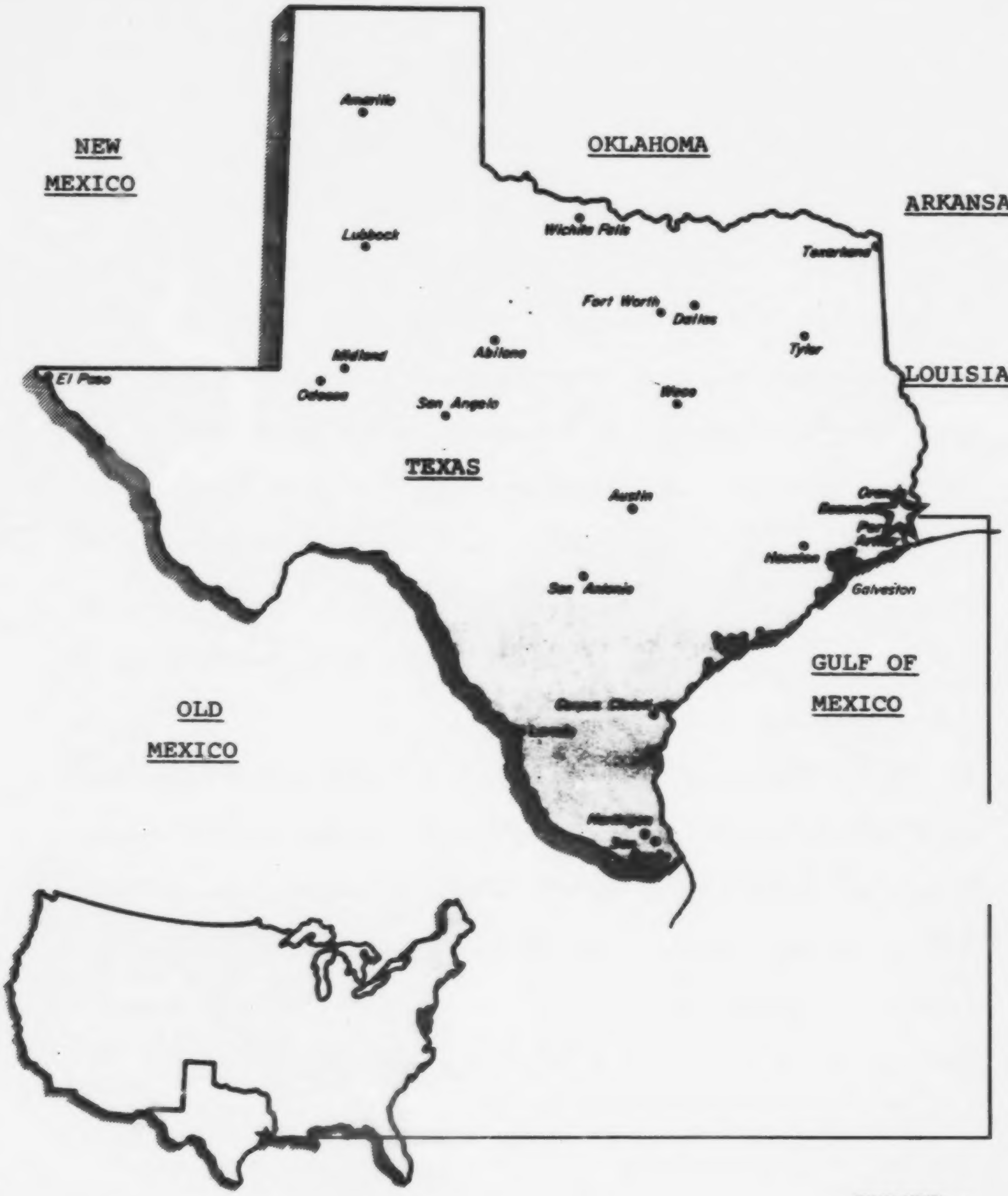

NEW MEXICO
OKLAHOMA
ARKANSAS
LOUISIANA
TEXAS
OLD MEXICO
GULF OF MEXICO
Amarillo
Lubbock
Wichita Falls
Texarkana
Fort Worth
Dallas
Tyler
Midland
Odessa
Abilene
El Paso
San Angelo
Waco
Austin
Orange
Beaumont
Port Arthur
Houston
Galveston
San Antonio
Corpus Christi
Laredo
Harlingen

FIGURE 6

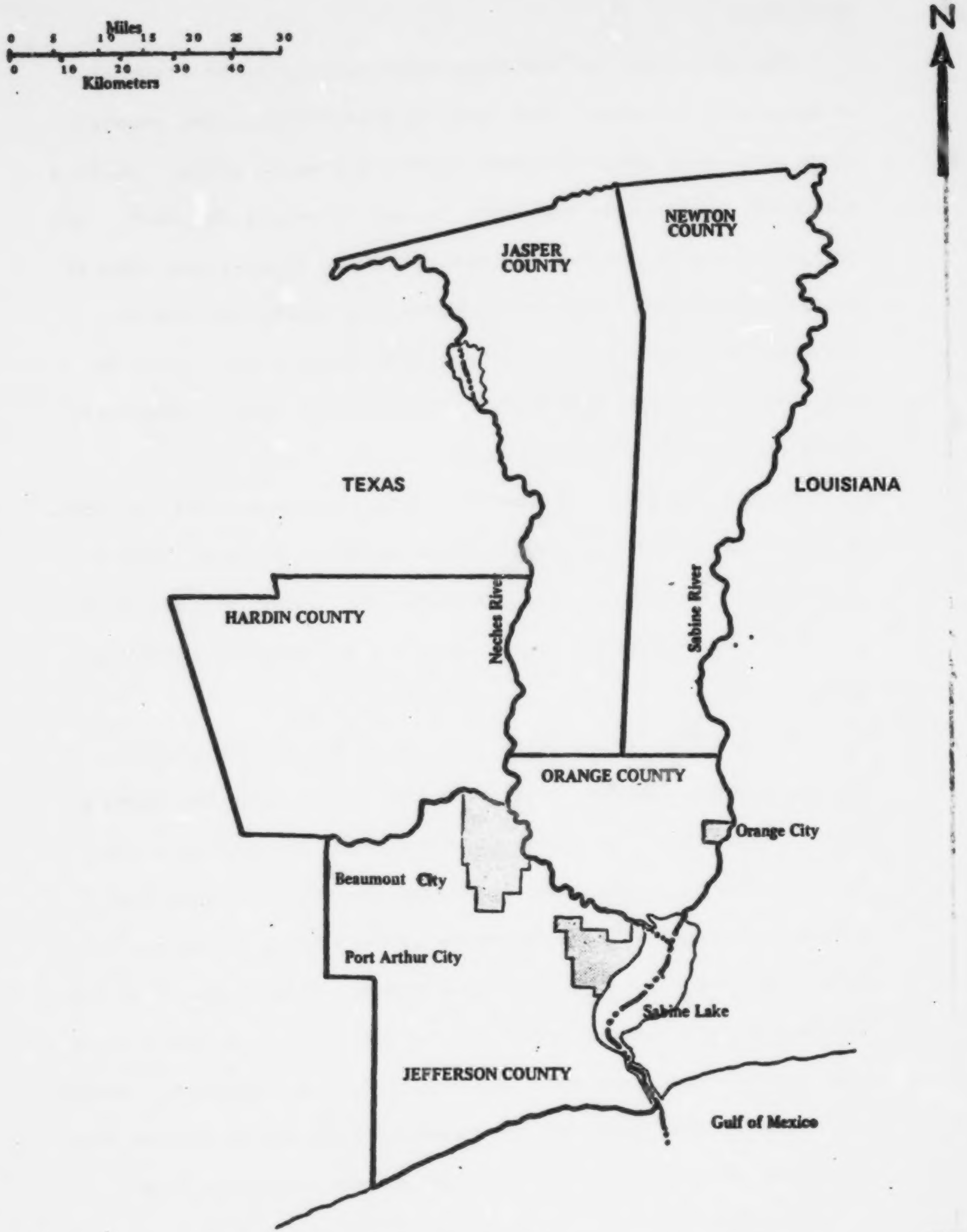

Miles
0 5 10 15 20 25 30
0 10 20 30 40
Kilometers
N
JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
HARDIN COUNTY
Neches River
Sabine River
ORANGE COUNTY
Orange City
Beaumont City
Port Arthur City
Sabine Lake
JEFFERSON COUNTY
Gulf of Mexico

Figure #7 Beaumont-Port Arthur-Orange Five County Study Area

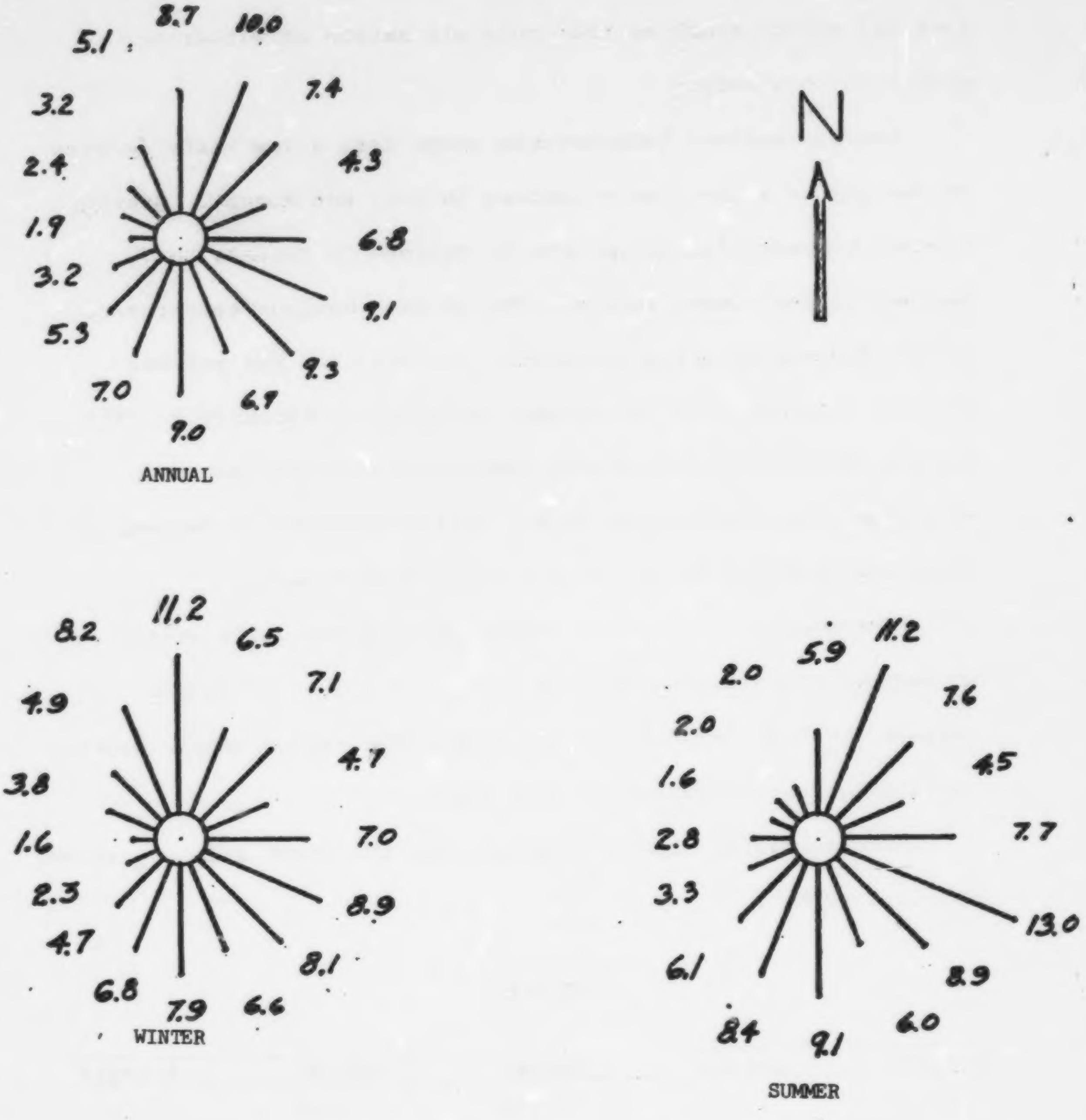
TOPOGRAPHY

The topography of the five counties within the study area is basically the same. The area is a relatively flat coastal plain with many small streams, bayous and marsh areas. Surface elevation varies from sea-level to approximately 250 feet. Two navigable rivers (Neches and Sabine) allow ocean-going vessels to serve the area. Deep water ports are located at Orange, Beaumont, and Port Arthur. The southernmost coastal port of the area is crossed by the Gulf Intracoastal Canal. Abundant water is a great asset to the area.

Hardin, Jasper, and Newton counties are about 70% forested. The land is gently rolling pine and hardwood forests. Poultry processing, farming, cattle ranching, and timber processing are the major industries in these three primarily rural counties.

METEOROLOGY

The climate of the study area is predominately marine. The many small streams, bays and marsh areas favor the development of both ground fog and advective fog. Prevailing winds are from the southeast, except during the winter months when frequent passages of high pressure systems bring invasions of polar air from the North. Daytime thermal inversions of at least one hour duration occur about 50% of the time. Low level inversion layers occur much more frequently during nighttime. Annual and seasonal wind data for the Beaumont-Port Arthur-Orange area are shown in Figure 8.[1] Sea breezes prevent extremely high



ANNUAL

WINTER

SUMMER

Figure8 - Wind Direction for Beaumont-Port Arthur-Orange Area
(numbers indicate % of time)

temperatures in the summer except on rare occasions. The area lies far enough south so that cold air masses of winter are moderated in severity.

Average maximum temperatures range from a low sixty degrees in January to a low ninety degrees in July and August. Average minimum temperatures range from 45 degrees in January to 75 degrees in the summer months. The extreme maximum temperature of 107 degrees occurred on August 10, 1962, and the extreme minimum temperature of 13 degrees occurred on February 2, 1951. Extreme departures from normal temperatures seldom occur on more than four consecutive days. Temperatures of 32 degrees or below are recorded in an average of 11 days a year.

A normal rainfall of 53 inches distributed quite evenly throughout the year and the nearness to the Gulf of Mexico explain the high humidity in the area. The region enjoys approximately 220 days of sunshine each year.

Average mixing depths in meters for the study area are shown below in Table 5.[2]

Table 5

Winter	Spring	Summer	Autumn	Average
710	1,000	1,290	1,120	1,030

The wind data and mixing depth information were utilized in the simulation model for the five county study area.

EMISSION INVENTORY

The National Air Pollution Control administration in cooperation with the State and local control programs conducted an inventory of air pollutant emissions for the five county Beaumont-Port Arthur-Orange study area. The method employed was the Rapid Survey Technique for Estimating Community Air Pollutant Emissions.[3] This technique provided estimates of the total emissions for the following five pollutants: sulfur oxides, nitrogen oxides; hydrocarbons; carbon monoxide, and particulate matter. Sulfur oxides, total particulates and carbon monoxide are considered in this report. No attempt was made to account for the effects of reactive pollutants combining following their release into the atmosphere.

Sulfur oxide levels and total particulate emissions illustrate the impact of industrial processing activities from stationary sources. Levels of carbon monoxide provide the best indication of the impact of gasoline powered motor vehicles.

The five county study area was divided into grid zones which served as the basis for locating sources and reporting emissions. Figure 9 shows the grid coordinate system for the Beaumont-Port Arthur-Orange study area. Major point source locations are shown in Figure 10. Most of the major point sources are located in Jefferson and Orange counties. A summary of the emissions by source category is shown in Figure 11. Table #6 gives a summary of Air Pollutant Emissions from all sources in tons/year for particulates; SO_x; and CO, all by Grid Areas and Figures 11-A, 11-B, and 11-C portray these as emission densities.

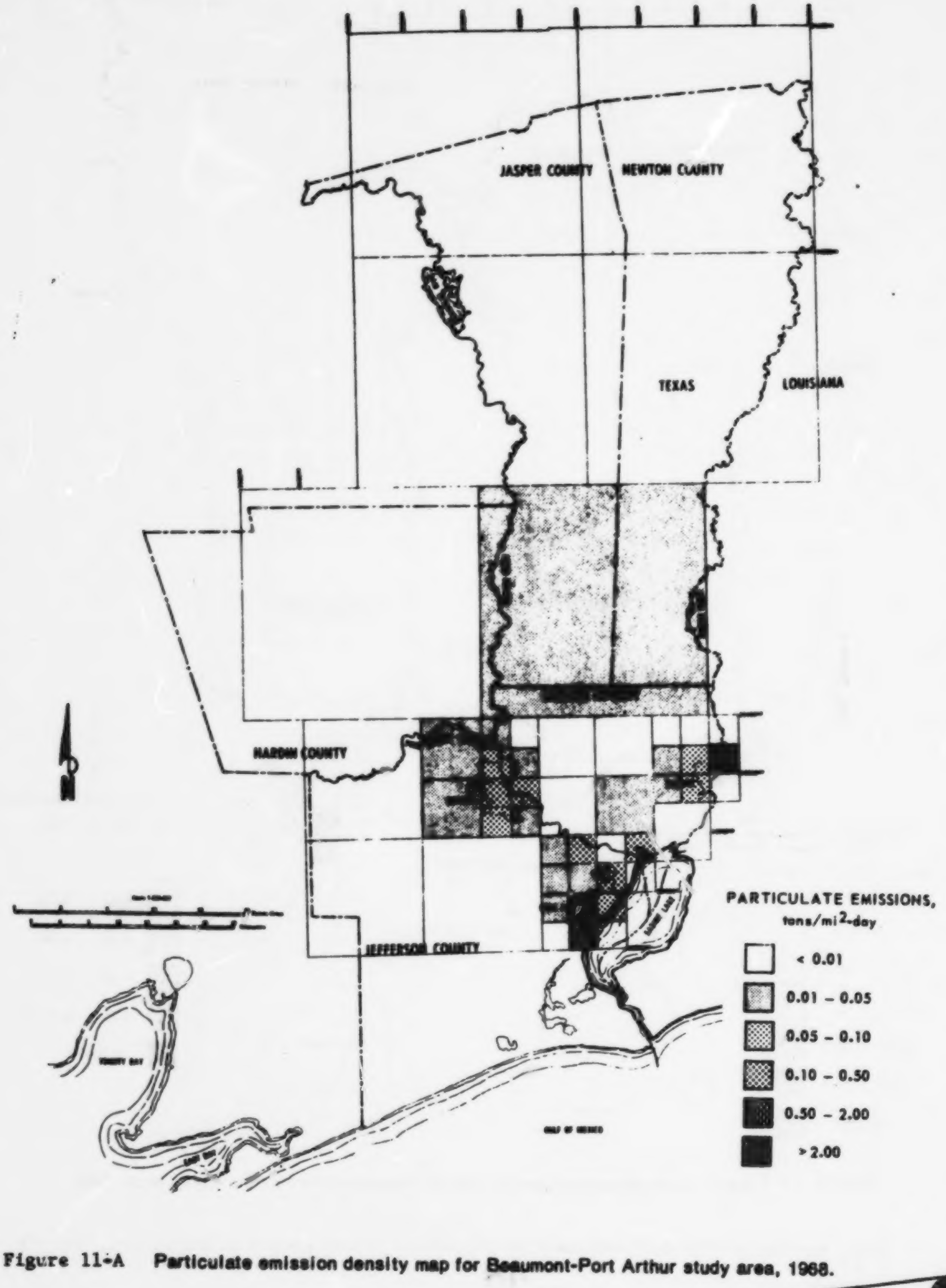

JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
HARDIN COUNTY
JEFFERSON COUNTY
PARTICULATE EMISSIONS,
tons/mi2-day
< 0.01
0.01 - 0.05
0.05 - 0.10
0.10 - 0.50
0.50 - 2.00
> 2.00

Figure 11-A Particulate emission density map for Beaumont-Port Arthur study area, 1968.

Reproduced from best available copy.

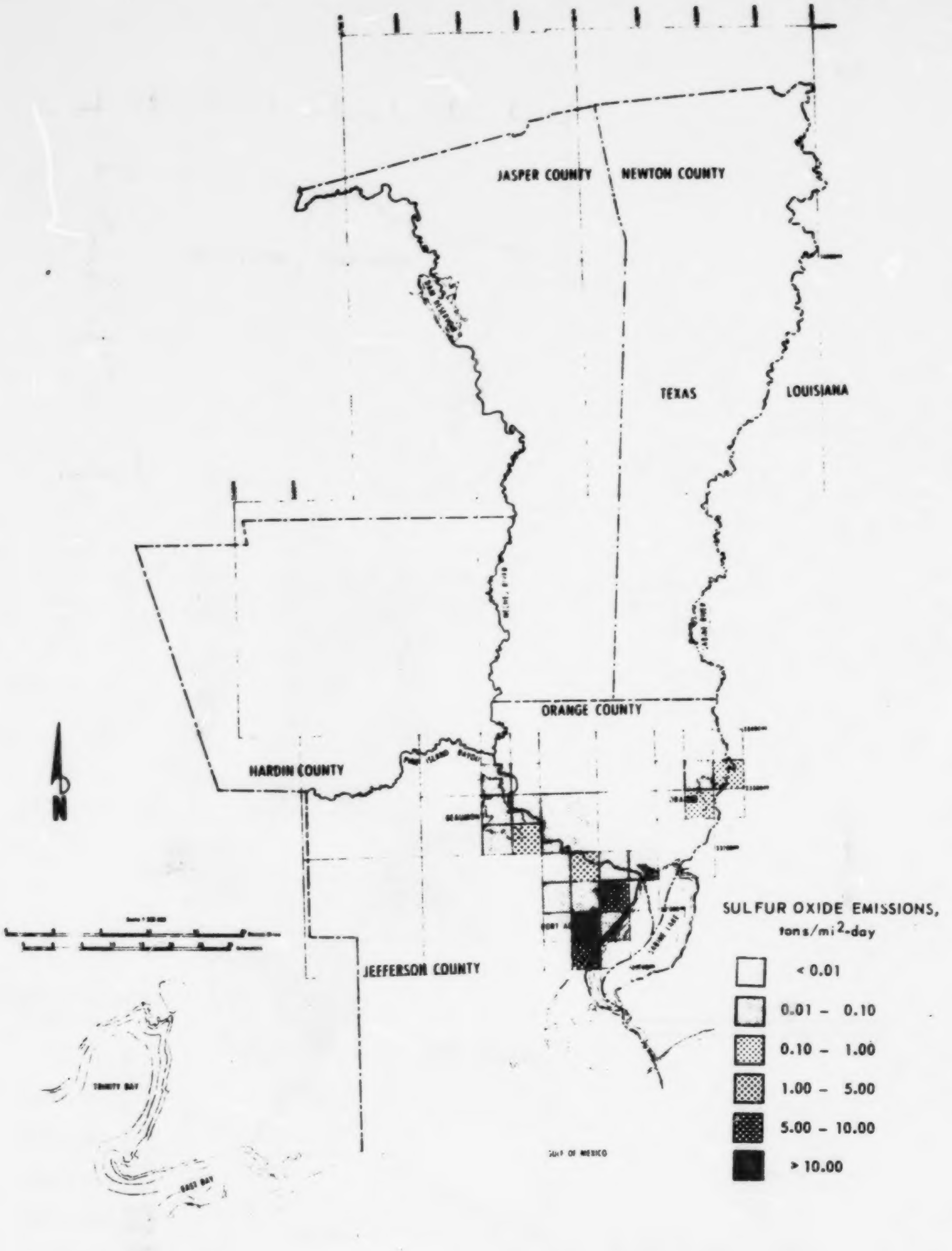

JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
ORANGE COUNTY
HARDIN COUNTY
JEFFERSON COUNTY
N
TRINITY BAY
EAST BAY
GULF OF MEXICO
SABINE LAKE
SULFUR OXIDE EMISSIONS,
tons/mi2-day
< 0.01
0.01 - 0.10
0.10 - 1.00
1.00 - 5.00
5.00 - 10.00
> 10.00

Figure 11-B Sulfur oxide emission density map for Beaumont-Port Arthur study area, 1968.

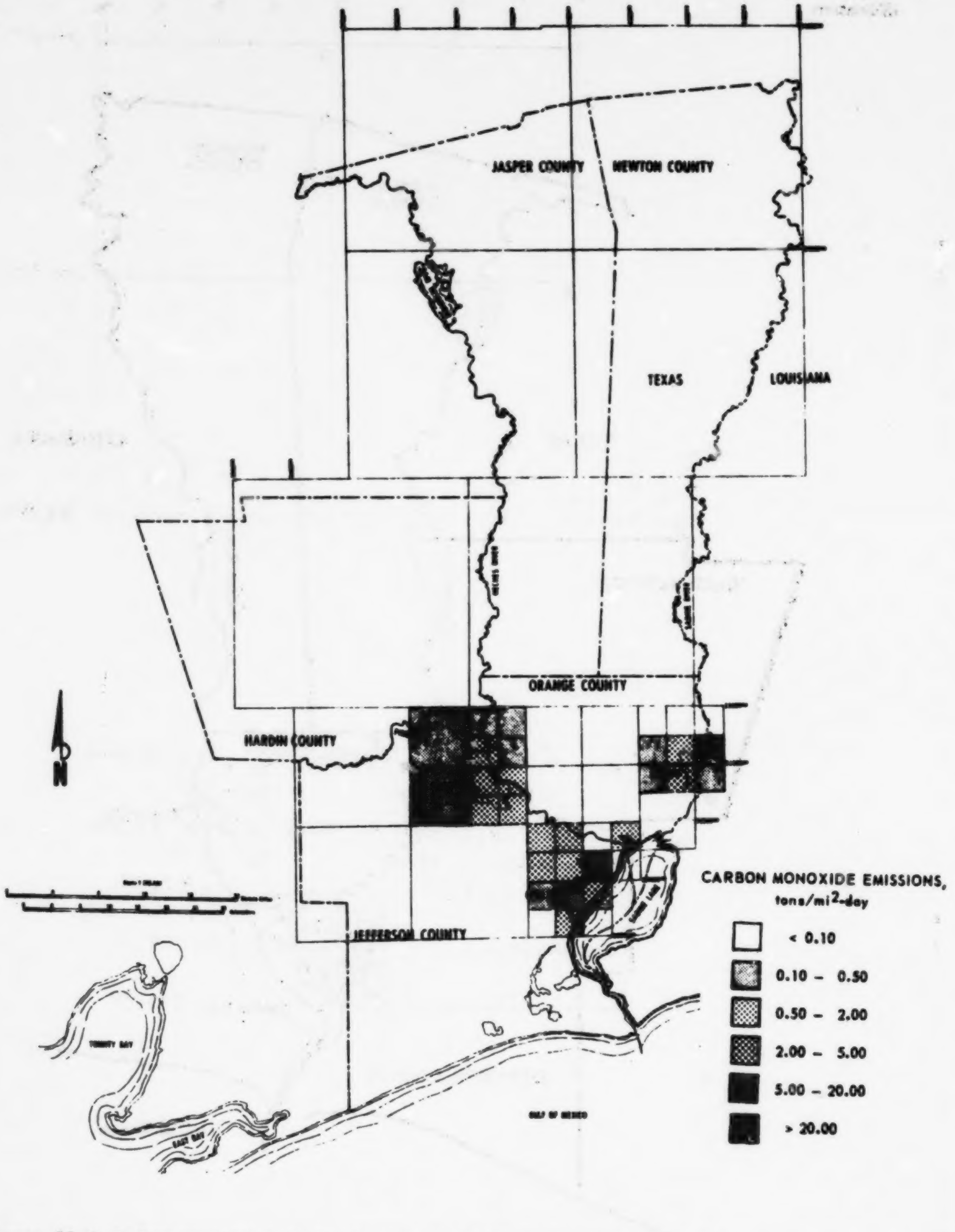

JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
ORANGE COUNTY
HARDIN COUNTY
JEFFERSON COUNTY
N
TRINITY BAY
EAST BAY
GULF OF MEXICO
CARBON MONOXIDE EMISSIONS,
tons/mi2-day
< 0.10
0.10 – 0.50
0.50 – 2.00
2.00 – 5.00
5.00 – 20.00
> 20.00

Figure 11-C Carbon monoxide emission density map for Beaumont-Port Arthur study area, 1968.

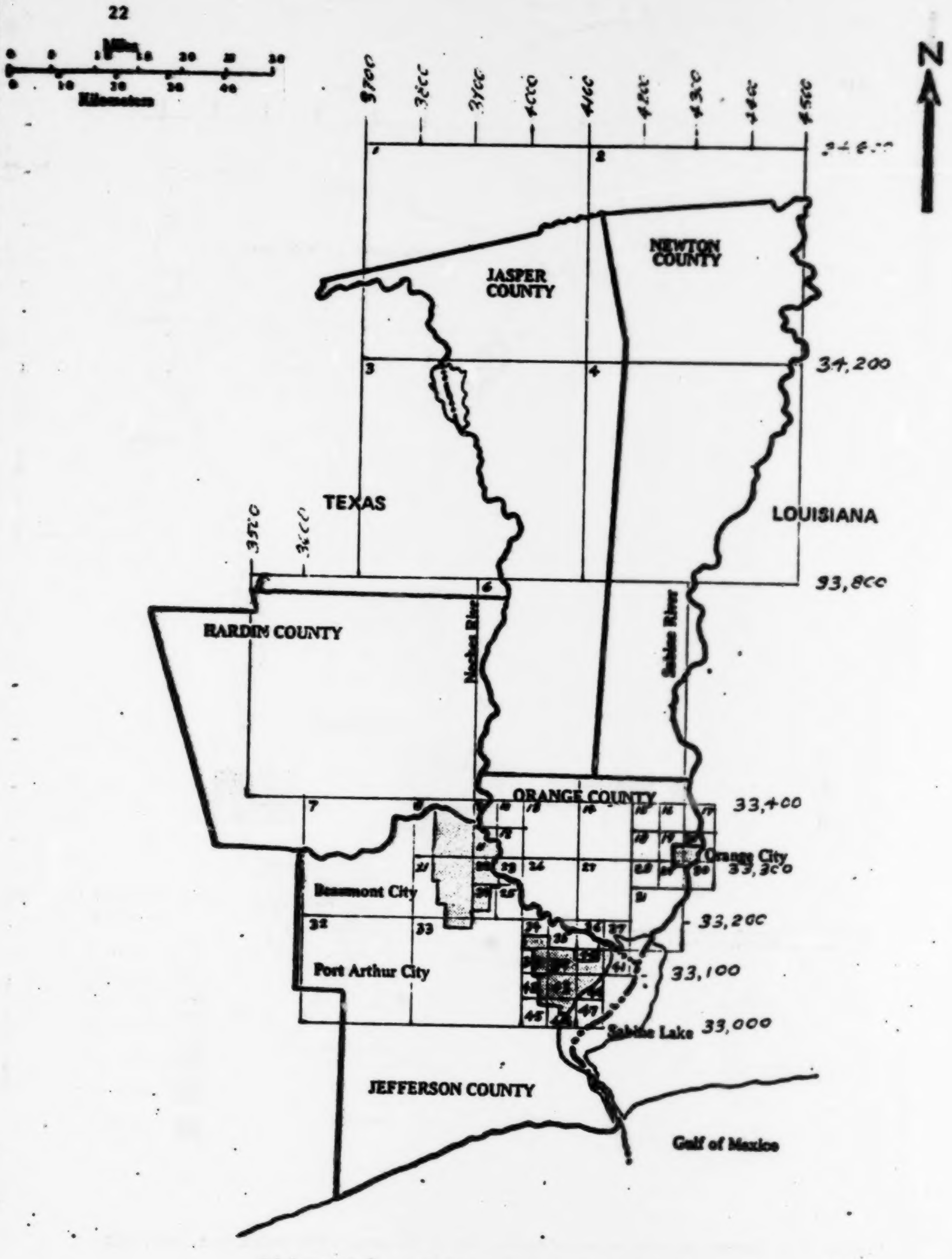
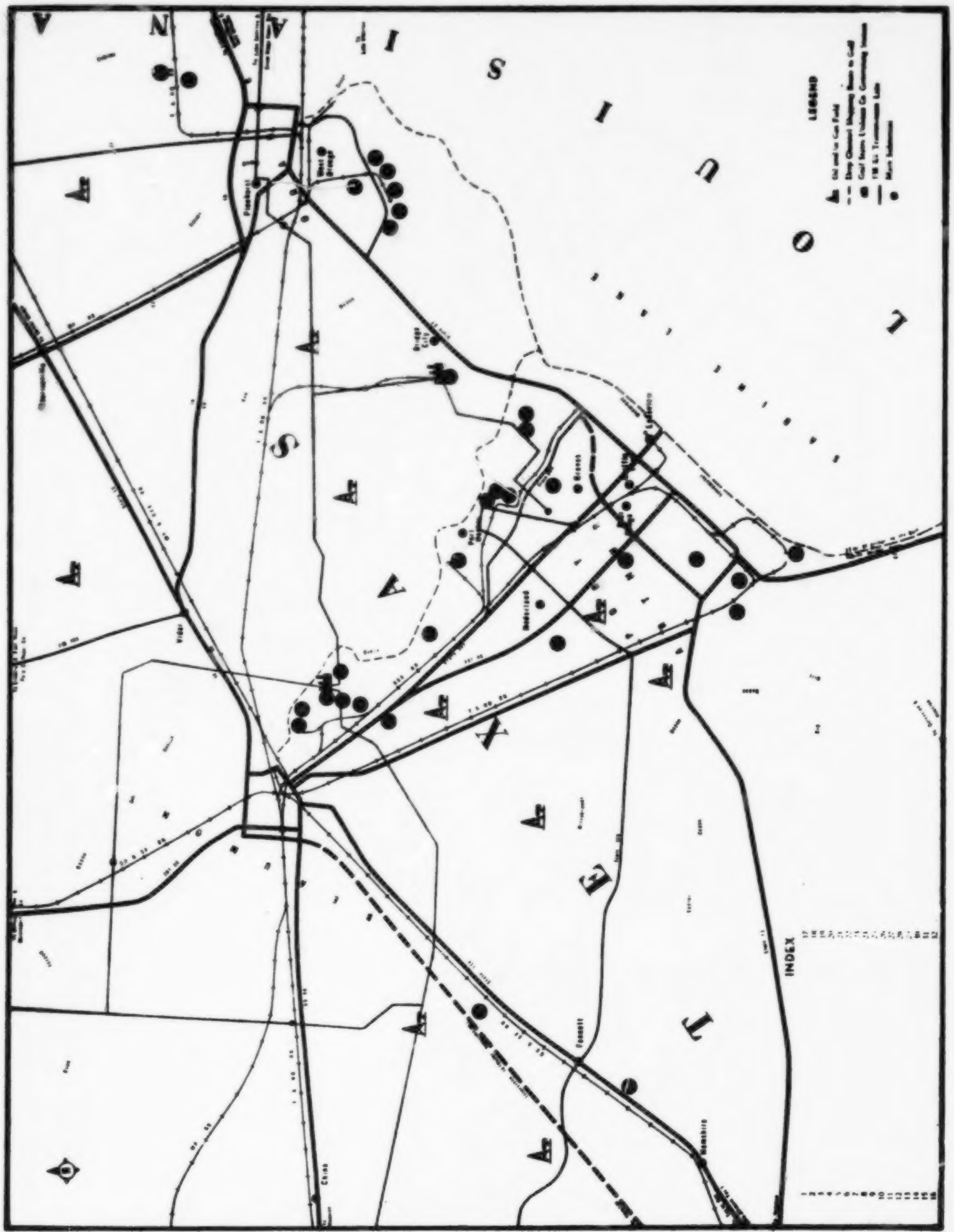

22
Miles
0 5 10 15 20 25 30
0 10 20 30 40
Kilometers
N
3700
3800
3900
4000
4100
4200
4300
4400
4500
34,600
34,200
33,800
33,400
33,300
33,200
33,100
33,000
3500
3600
1
2
3
4
5
6
7
8
JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
HARDIN COUNTY
Neches River
Sabine River
ORANGE COUNTY
Orange City
Beaumont City
Port Arthur City
32
33
Sabine Lake
JEFFERSON COUNTY
Gulf of Mexico

Figure # 9 GRID COORDINATE SYSTEM


LOUISIANA
TEXAS
LEGEND
Oil and/or Gas Field
Deep Channel Shipping Route to Gulf
Gulf States Utilities Co. Generating Station
Major Industries
INDEX

MAJOR POINT SOURCE LOCATIONS AND

LOCATION OF MAJOR INDUSTRIES IN THE

JEFFERSON-ORANGE REGION

Reproduced from best available copy.

Figure 10

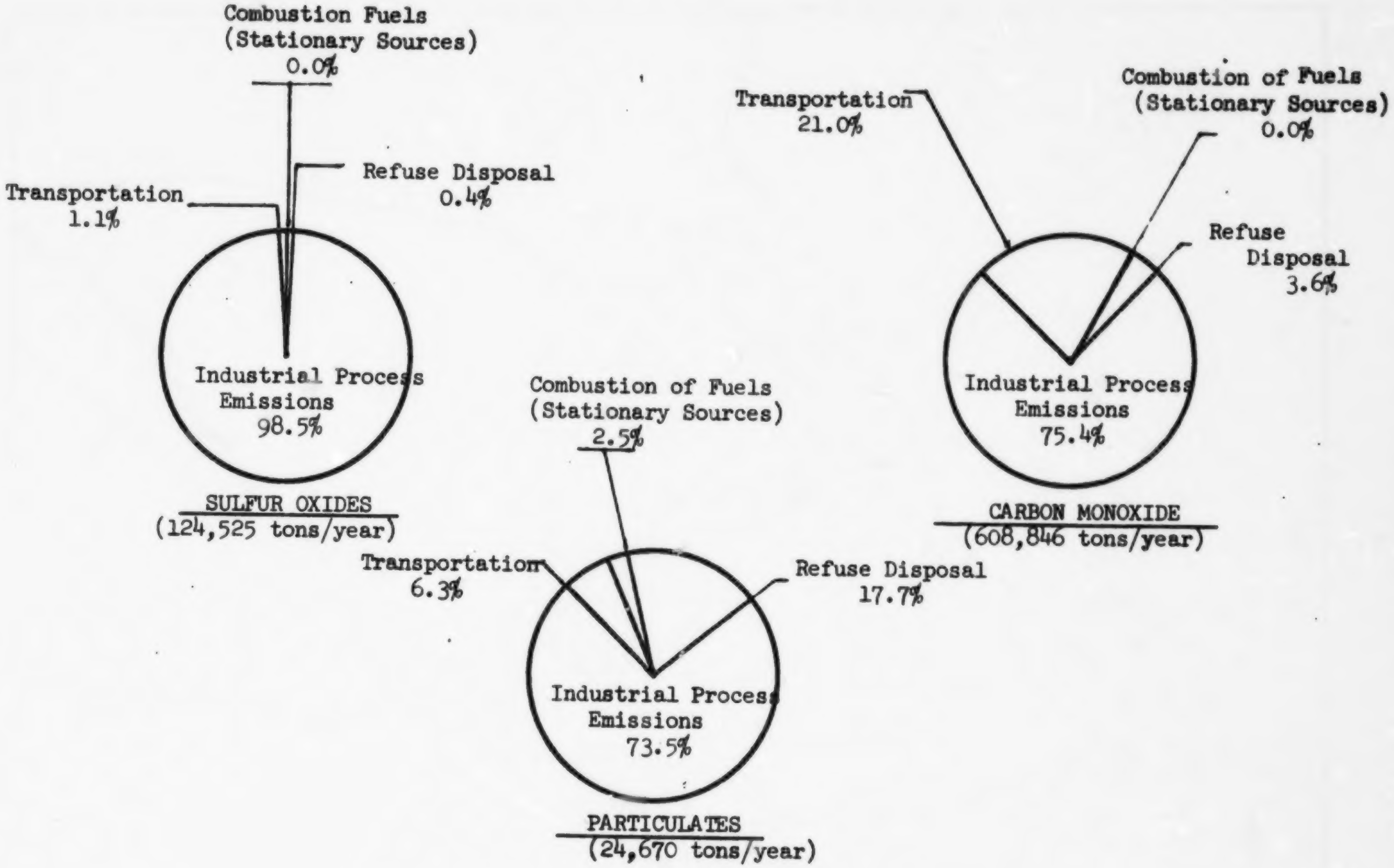


Figure 11 SUMMARY of Air Pollutant Emissions-1967

NOTE: This information represents data on specific air pollutant emissions gathered during the rapid survey for the major point sources shown in Figure and the area sources. It should not be interpreted as representative of air pollutant emissions for any specific location within the study area.

Table # 6

SUMMARY OF AIR POLLUTANT EMISSIONS
FROM ALL SOURCES, IN
BEAUMONT - PORT ARTHUR - ORANGE AREA
BY GRID, IN TONS/YEAR

GRID	AREA MILES^2	SOX ANNUAL AVERAGE	PARTICULATES ANNUAL AVERAGE	CO ANNUAL AVERAGE
1	617.7	0.1	0.5	6.7
2	617.7	0.0	0.1	2.3
3	617.7	0.1	0.3	6.9
4	617.7	0.1	0.7	15.3
5	617.7	0.2	0.5	19.4
6	617.7	1.5	9.8	10.1
7	154.4	0.1	0.2	4.7
8	38.6	0.1	0.4	12.8
9	9.6	0.0	0.3	2.3
10	9.6	0.0	0.0	1.0
11	9.6	0.2	0.9	27.8
12	9.6	0.0	0.1	3.6
13	38.6	0.0	0.1	2.0
14	38.6	0.0	0.1	1.6
15	9.6	0.0	0.0	0.9
16	9.6	0.0	0.0	0.6
17	9.6	0.0	0.0	0.4
18	9.6	0.0	0.1	2.0
19	9.6	0.1	0.6	14.2
20	9.6	1.6	6.8	182.3
21	38.6	0.1	0.4	12.4
22	9.6	0.3	1.4	43.9
23	9.6	0.3	1.0	10.6
24	9.6	0.1	0.5	16.1
25	9.6	10.2	0.3	9.1
26	38.6	0.2	0.1	2.0
27	38.6	0.1	1.0	2.3
28	9.6	0.0	0.1	2.5
29	9.6	2.9	0.6	29.9
30	9.6	0.0	0.1	3.0
31	38.6	0.0	0.1	1.7
32	154.4	0.0	0.1	2.6
33	154.4	0.0	0.2	3.6
34	9.6	0.1	0.2	5.5
35	9.6	22.0	3.8	19.5
36	9.6	0.4	0.0	0.9
37	9.6	0.3	1.4	7.8
38	9.6	0.2	0.4	19.9
39	9.6	0.1	0.3	8.4
40	9.6	60.5	1.9	511.5
41	9.6	0.0	0.0	0.7
42	9.6	0.0	0.1	2.6
43	9.6	153.2	6.2	593.5
44	9.6	0.2	0.8	28.4
45	9.6	0.0	0.0	0.4
46	9.6	85.8	25.1	12.2
47	9.6	0.3	0.0	0.2

AIR QUALITY ANALYSIS

The geographical distribution of pollutant sources illustrate the core of the problem area. However, this does not elucidate the extent of the influence of the pollution sources on the people and the property located outside of the highly urbanized portions of the Beaumont-Port Arthur-Orange area. A study of air quality levels known to occur is useful in determining the area affected by the pollution sources and thus subject to inclusion in the Air Quality Control Region. Such an analysis can be based directly on air sampling data in those instances where the monitoring program covers a large enough area and has been in existence long enough to provide a reliable pattern of air quality throughout the region under study. Since such comprehensive air quality data rarely exists, it becomes necessary to develop estimates of prevailing air quality. Diffusion modeling is a technique by which such estimates can be made based on the location and quantity of the pollutant emissions and on meterological conditions. Topography is reflected in the results of the model, but only tb the extent that if influences general meteorological conditions.

The diffusion model was applied for each of the three pollutants for an average summer day, winter day, and annual day. Since the Martin-Tikvart model[4] used in this study attempts to show long-term rather than episodic air quality conditions, only average emissions and long-term meteorology are considered. The results of the diffusion model are theoretical in nature and are not meant to show exact concentrations. The relative magnitudes and general shape of the contours, however, should be valid. The outputs from the computer model have been adjusted to reflect measured air quality data. Figures 12, 13, 14 show these adjusted values for particulates, sulfur oxides, and carbon monoxide, respectively.

SUSPENDED PARTICULATE AIR LEVELS

The levels predicted by the diffusion model were generally lower than the actual measured air quality data. However, the theoretical levels aid in delineating the affected area. Figure 12 shows the annual average distribution of particulate pollution. Portions of Jefferson, Orange, Jasper, Newton and Hardin counties are shown to be affected.

SULFUR OXIDE LEVELS

Figure 13 shows the distribution of sulfur oxides over the five county study area. The absence of high sulfur content fuels eliminates the area-wide sulfur oxide problems encountered in many other metropolitan areas. Sulfur oxides are present in Jefferson and Orange counties.

CARBON MONOXIDE LEVELS

Since the primary source of carbon monoxide is the internal combustion engine, the distribution of this pollutant tends to correlate with major traffic patterns. The influences of the interstate freeway system are obvious. Portions of Jefferson,

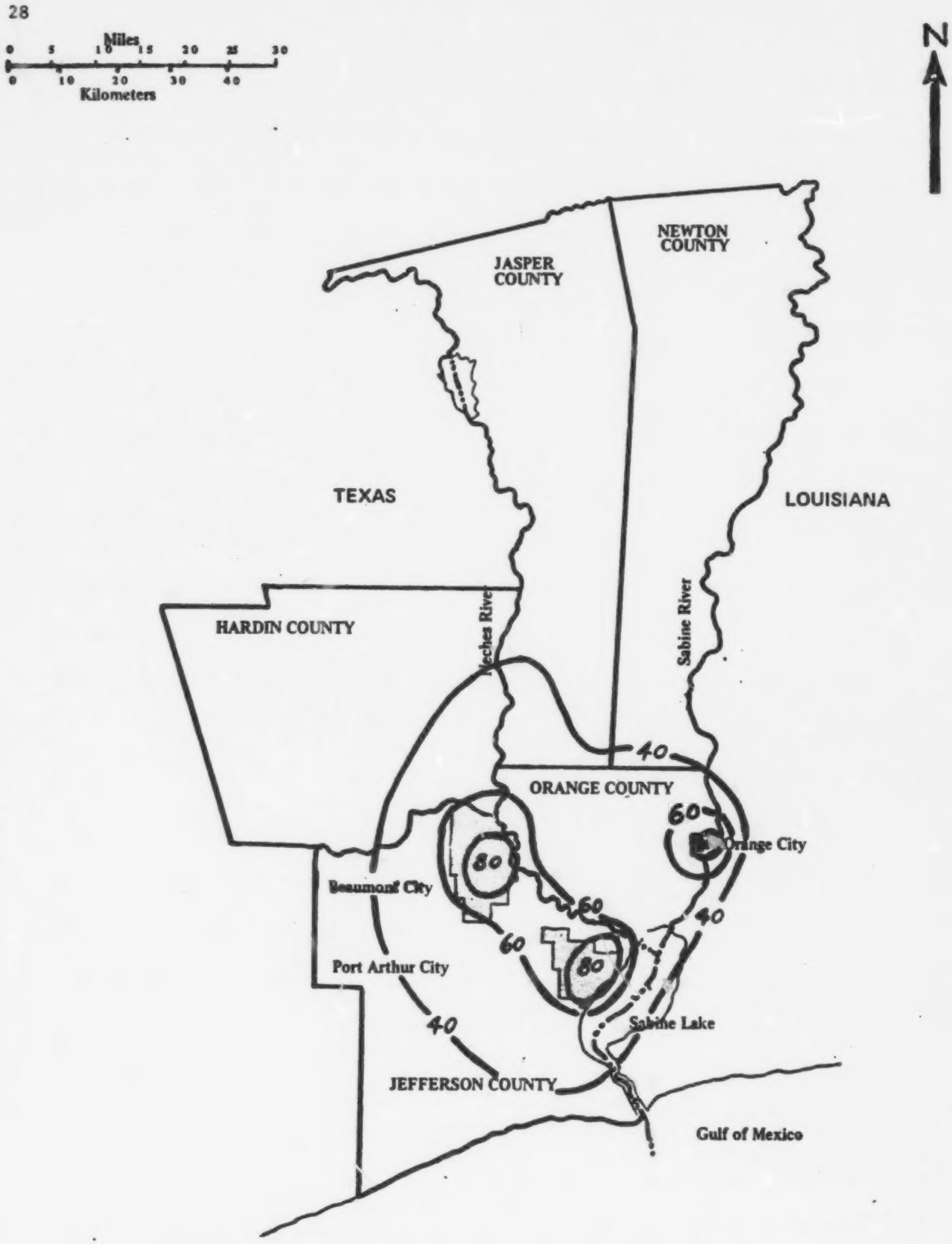
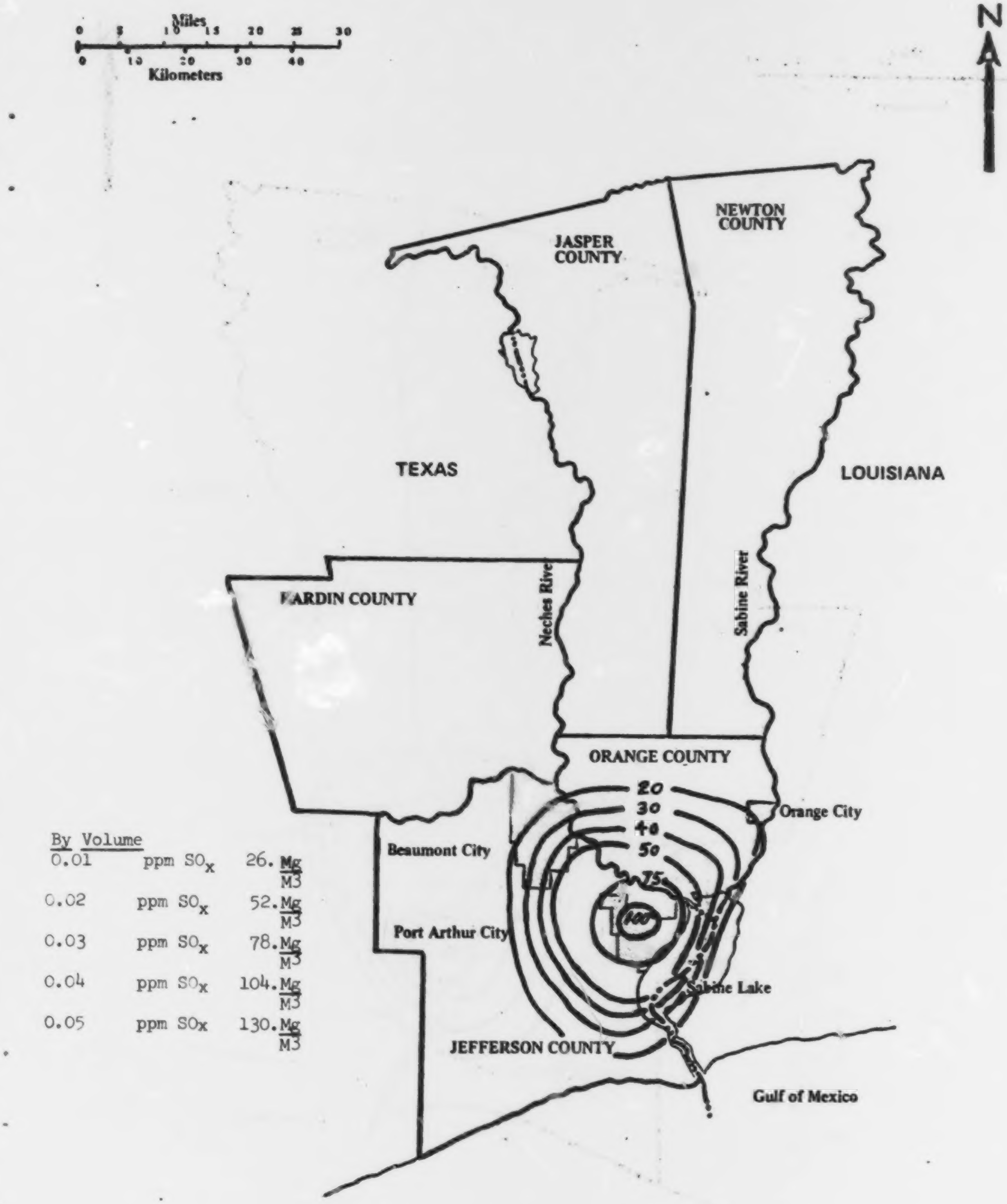
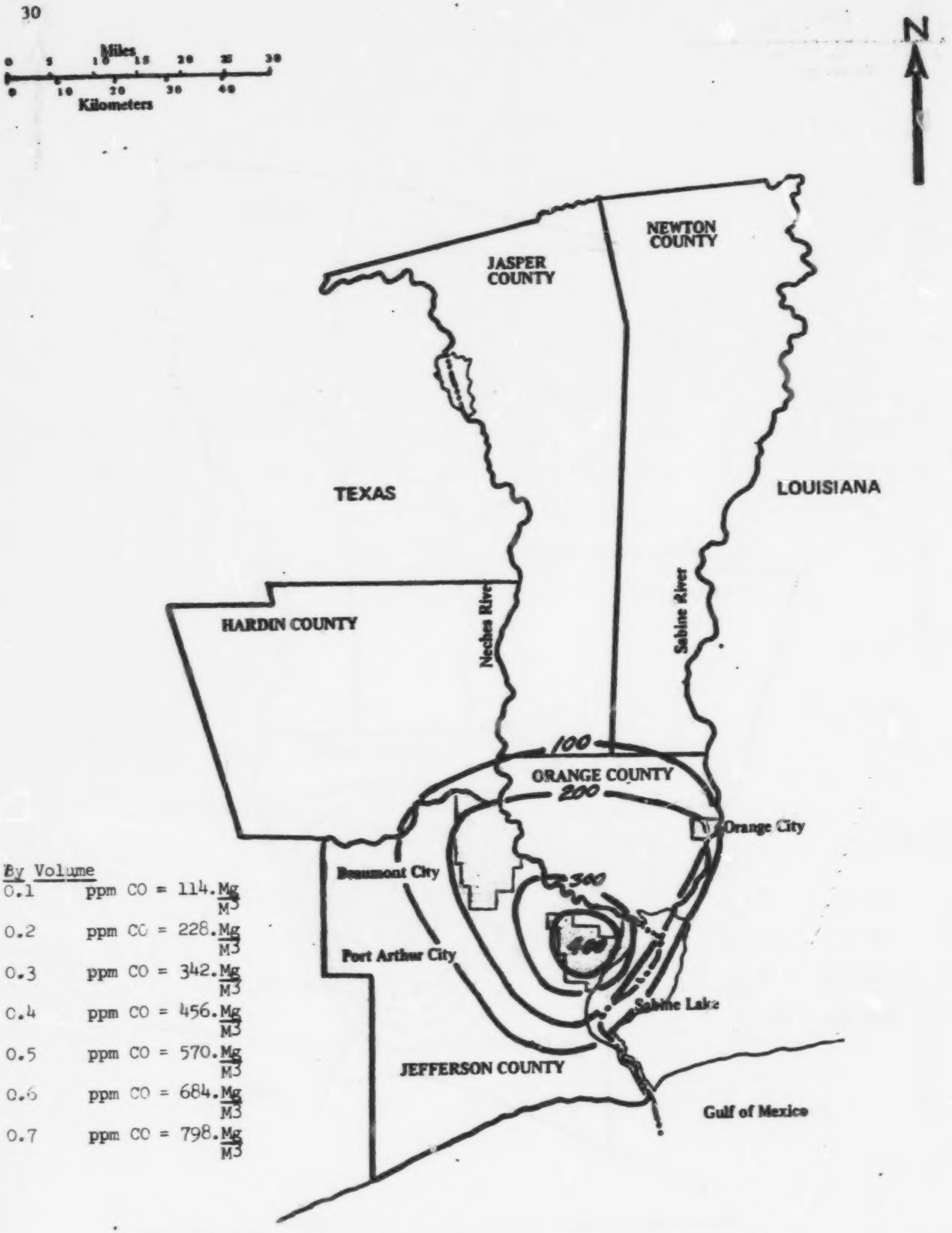

28
Miles
0 5 10 15 20 25 30
0 10 20 30 40
Kilometers
N
JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
HARDIN COUNTY
Neches River
Sabine River
40
ORANGE COUNTY
60
Orange City
80
Beaumont City
60
60
40
80
Port Arthur City
40
Sabine Lake
JEFFERSON COUNTY
Gulf of Mexico

Figure # 12 Average Annual Particulate Concentrations (micrograms per cubic meter μg/M^3). Point and Area Sources.


Miles
0 5 10 15 20 25 30
0 10 20 30 40
Kilometers
N
JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
HARDIN COUNTY
Neches River
Sabine River
ORANGE COUNTY
Orange City
Beaumont City
Port Arthur City
20
30
40
50
75
100
Sabine Lake
JEFFERSON COUNTY
Gulf of Mexico

By Volume		
0.01	ppm SO_x	26. $\frac{Mg}{M3}$
0.02	ppm SO_x	52. $\frac{Mg}{M3}$
0.03	ppm SO_x	78. $\frac{Mg}{M3}$
0.04	ppm SO_x	104. $\frac{Mg}{M3}$
0.05	ppm SOx	130. $\frac{Mg}{M3}$

Figure #13 Average Annual Sulfur Oxide (SO_x) Concentrations
(micrograms per cubic meter: $\mu g/M^3$)
Point and Area Sources


30
Miles
0 5 10 15 20 25 30
0 10 20 30 40
Kilometers
N
JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
HARDIN COUNTY
Neches River
Sabine River
100
ORANGE COUNTY
200
Orange City
Beaumont City
300
400
Port Arthur City
Sabine Lake
JEFFERSON COUNTY
Gulf of Mexico

By Volume

0.1 ppm CO = $114.\frac{Mg}{M^3}$

0.2 ppm CO = $228.\frac{Mg}{M^3}$

0.3 ppm CO = $342.\frac{Mg}{M^3}$

0.4 ppm CO = $456.\frac{Mg}{M^3}$

0.5 ppm CO = $570.\frac{Mg}{M^3}$

0.6 ppm CO = $684.\frac{Mg}{M^3}$

0.7 ppm CO = $798.\frac{Mg}{M^3}$

Figure # 14 Average Annual Carbon Monoxide (CO) Concentrations (micrograms per cubic meter µg/M^3). Point and Area Sources.

Orange, and Hardin counties are shown in Figure 14 to be experiencing carbon monoxide pollution.

SUMMARY

The engineering evaluation of the five county study area shows that at the present time the major point sources are located in Jefferson and Orange counties. Receptors in these two counties are also shown to be experiencing the major air pollution problems.

THE RECOMMENDED REGION

Subject to the scheduled consultation, the Texas Air Control Board recommends that the Secretary, Department of Health, Education, and Welfare, designate an air quality control region in the Beaumont-Port Arthur-Orange area, consisting of the following jurisdictions in Texas:

Jefferson County
Orange County
Hardin County
Jasper County
Newton County

As so recommended, the Texas portion of Southern Louisiana-Southeast Texas Air Quality Control Region would consist of the territorial area encompassed by the outermost boundaries of the recommended jurisdictions. The recommended Region is shown in Figure 15.

DISCUSSION OF PROPOSAL

To be successful, an air quality control region should meet three basic conditions. First, its boundaries should encompass most pollution sources as well as most people and property affected by those sources. Second, the boundaries should encompass those locations where industrial and residential development will create significant air pollution problems in the future. Third, the boundaries should be chosen in a way which is compatible with and even fosters unified and cooperative governmental administration of the

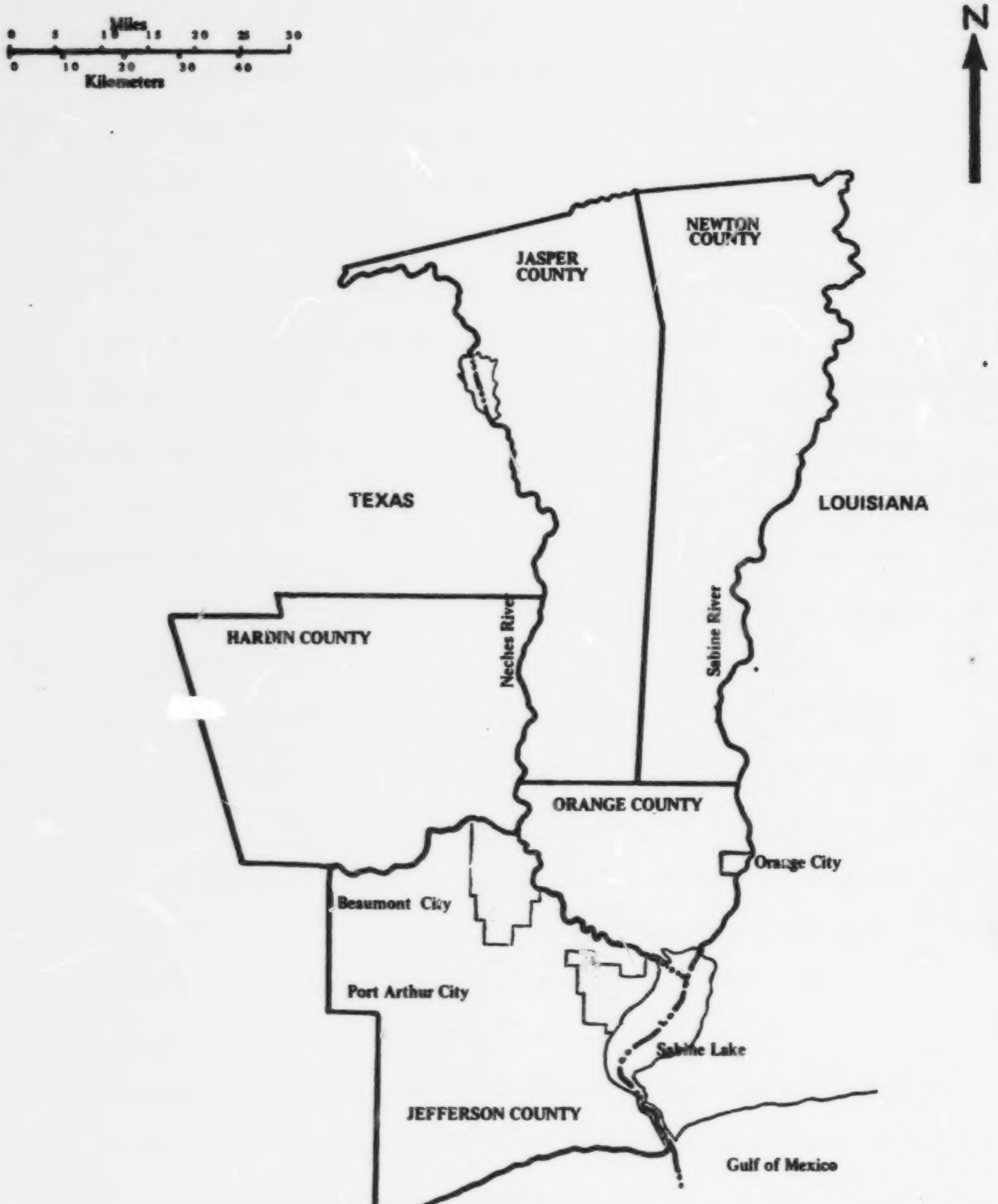

Miles
0 5 10 15 20 25 30
0 10 20 30 40
Kilometers
N
JASPER COUNTY
NEWTON COUNTY
TEXAS
LOUISIANA
HARDIN COUNTY
Neches River
Sabine River
ORANGE COUNTY
Orange City
Beaumont City
Port Arthur City
Sabine Lake
JEFFERSON COUNTY
Gulf of Mexico

Figure #15 Recommended Air Quality Control Region for Beaumont-Port Arthur-Orange Area.

air resources throughout the region. The "Evaluation of Engineering Factors" (discussion beginning with page 15) discussed the first of these conditions, and the "Evaluation of Urban Factors" (page 1), the second and third.

The first consideration--that most air pollution sources and receptors be within the Region boundaries--is satisfied by the proposed Region. Major point sources are located in two counties--Jefferson and Orange. Secondary sources are located in all five counties. Emissions of particulates, carbon monoxide, and sulfur oxides are greatest in Jefferson and Orange counties.

The second consideration is directed towards future population and industrial expansion. Approximately 472,000 people live in the recommended Region. Estimates for the year 1985 show 650,000 people in the five county area. Industrial expansion is certain to include the counties which today are primarily rural.

The third objective relates to governmental administration in the area. Based on the technical data presented on air pollutant emissions and resultant ambient air concentrations, only two counties need be part of the Region to attack the air pollution problem. Hardin, Jasper, and Newton are primarily rural and may remain so through 1990. However, in order to plan an effective long range control program, it is best to include all five counties within the Region.

In summary, the Region recommended is considered on the whole to be the most cohesive and yet inclusive area within which an effective effort can be mounted to prevent and control air pollution in the Beaumont-Port Arthur-Orange Metropolitan Area.

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4. "General Atmospheric Diffusion Model for Estimating the Effects on Air Quality of One or More Sources," D. Martin and Tikvart, Minnesota, June, 1968.

5. Texas Highway Department, Regional Transportation Plan, Jefferson and Orange Counties, Vol. 2, 1963-85.

6. Texas Almanac, 1970, pp. 167-170, A. H. Belo Corporation

7. U. S. Census of Agriculture, 1959, U.S. Department of Agriculture, Washington, D.C., Part 37, County Table # 5.

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SECTION III

ANALYSIS AND PROPOSAL FOR THE LOUISIANA PORTION OF THE SOUTHERN LOUISIANA-SOUTHEAST TEXAS REGION BY THE FEDERAL GOVERNMENT IN COOPERATION WITH THE STATE OF LOUISIANA

EVALUATION OF URBAN FACTORS

Factors of major importance in ~~considering boundaries for~~ an air quality control region ~~are those~~ which have to do with the extent, nature, and dynamics of urbanization and industrialization within the region. In this discussion of the Southern Louisiana area, the geography of the region will be reviewed since its locational and physical characteristics can affect the scale and direction of urban and industrial growth. The area's present population and economic activity patterns will then be discussed, and available projections of future growth summarized. Anticipated rates of growth of population and industry are of particular importance in determining the size of an air quality control region because the region should take account of probable future air pollution problems in addition to those which exist at present.

GEOGRAPHY OF THE REGION

In this study, the Southern Louisiana area consists of the 38 parishes in the southern half of the State of Louisiana. The northern boundary of the study area is formed by the northern limits of Vernon, Rapides, and Avoyelles Parishes (Figure 3). Further analysis of the northern boundary of the study area revealed that one additional parish - Grant - should also be included because of its close ties to Alexandria in Rapides Parish.

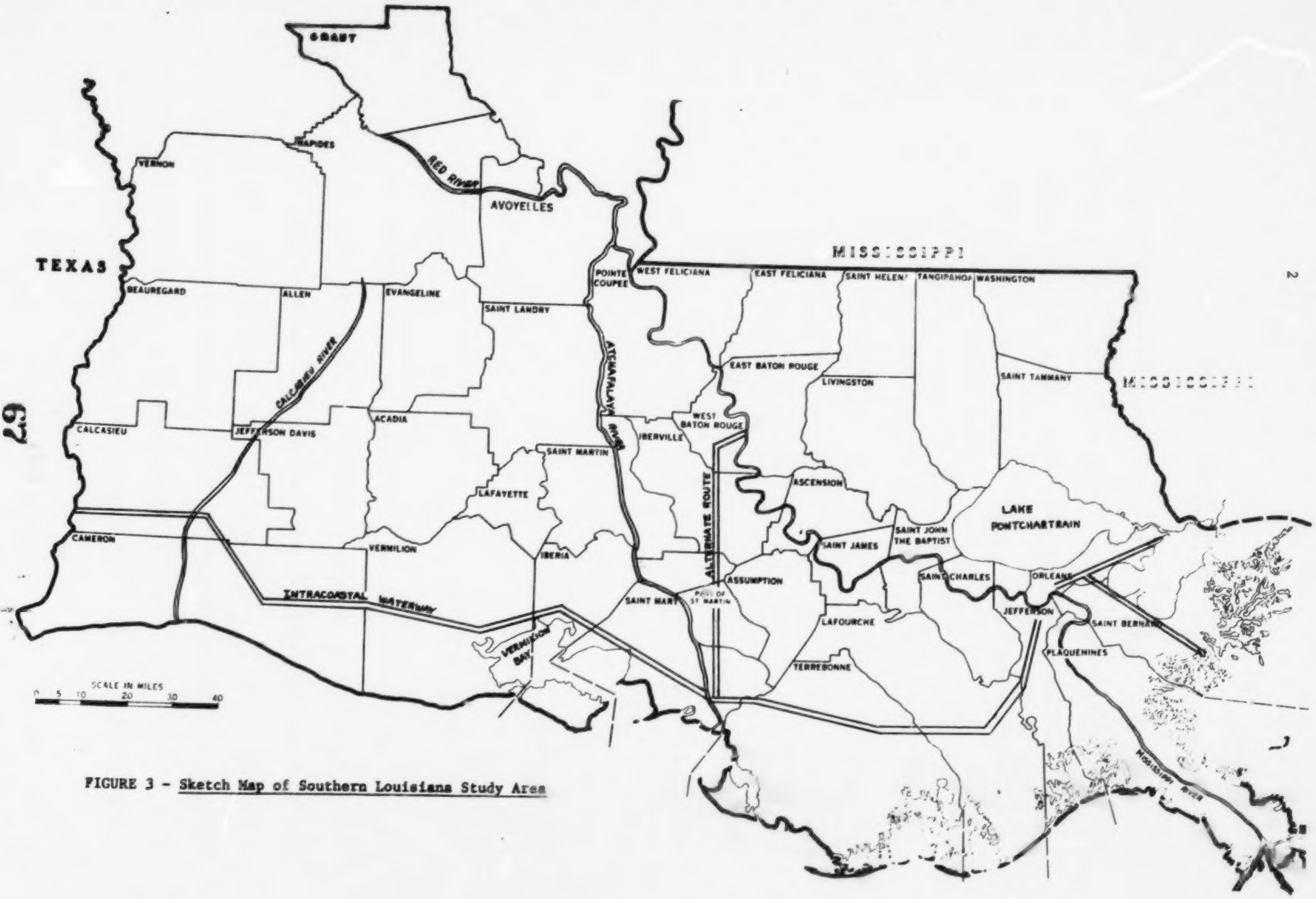
TEXAS
MISSISSIPPI
MISSISSIPPI
GRANT
RAPIDES
VERNON
RED RIVER
AVOYELLES
POINTE COUPEE
WEST FELICIANA
EAST FELICIANA
SAINT HELENA
TANGIPAHOA
WASHINGTON
BEAUREGARD
ALLEN
EVANGELINE
SAINT LANDRY
ATCHAFALAYA RIVER
EAST BATON ROUGE
LIVINGSTON
SAINT TAMMANY
CALCASIEU RIVER
ACADIA
CALCASIEU
JEFFERSON DAVIS
WEST BATON ROUGE
IBERVILLE
SAINT MARTIN
LAFAYETTE
ALTERNATE ROUTE
ASCENSION
LAKE PONTCHARTRAIN
SAINT JOHN THE BAPTIST
SAINT JAMES
CAMERON
VERMILION
IBERIA
ASSUMPTION
SAINT CHARLES
ORLEANS
INTRACOASTAL WATERWAY
SAINT MARY
PART OF ST MARTIN
JEFFERSON
SAINT BERNARD
LAFOURCHE
VERMILION BAY
PLAQUEMINES
TERREBONNE
SCALE IN MILES
0 5 10 20 30 40
MISSISSIPPI RIVER

FIGURE 3 - Sketch Map of Southern Louisiana Study Area

Proceeding generally from the north and going southward, the terrain of the study area includes rolling uplands, flat prairie, alluvial plains, and coastal swamps and marshlands. The marshlands, dotted with thousands of salt water lakes and lagoons, extend in a wide fringe along a 1,500-mile coastline on the Gulf of Mexico. Offshore, there are islands as well as State and Federal lands which lie beneath shallow Gulf waters.

Maximum elevations range from 100 to 300 feet above sea level in the upland country to 60 feet in the prairie regions, and to sea level or below in the alluvial plains and coastal regions.

The outstanding geographic feature of the area is the Mississippi River flowing southeastward toward the Gulf of Mexico. Alluvial plains formed by the River are relatively narrow in the north but widen into a vast delta region below the City of Baton Rouge. The River today flows at a higher elevation than the alluvial plains alongside so that it must be confined by a continuous line of levees, supplementing naturally occurring ridge formations which serve the same purpose. Bluff lands bordering the alluvial plains slope gently to the west and the east.

West of the Mississippi River, in the northern section of the study area, the Red River flows through Rapides Parish and along the northern and eastern borders of Avoyelles Parish.

A branch of the Red River joins the Mississippi east of Pointe Coupee Parish, but a second branch merges with the Atchafalaya River. The latter proceeds due southward into the Gulf.

Farther to the west, the Calcasieu River drains into Calcasieu Lake which lies below the City of Lake Charles. The western limit of the study area and the boundary between the States of Louisiana and Texas is formed by the Sabine River.

East of the Mississippi River alluvial plain, an upland terrain in the north is succeeded by lower-lying lands, swamp areas, and Lake Pontchartrain, which occupies 630 square miles of southeastern Louisiana.

The study area is rich in natural resources. The northern uplands are studded with pine forests. The plains areas contain fertile alluvial soils and plentiful water. On the swampy shorelands, dense cypress and live oak forests thrive. The bayous, inlets, and marshes of the coastal areas are habitats of muskrats, nutria, otter, and other fur bearing animals. Shellfish proliferate at many offshore locations. Below the surface of the land and under the water of offshore areas, there lie vast deposits of oil, natural gas and sulfur, as well as other minerals such as salt, gypsum, and lime.

These resources have been the foundation of industries ranging from lumber and paper manufacture, shrimp harvesting, and fur pelt production to sulfur mining, petroleum refining, and petrochemicals maufacture. A sub-tropical climate, combined with the area's soil and water resources, has permitted cotton, sugar cane, and rice production to flourish.

A vast transportation network adds to Southern Louisiana's locational advantages for urban and industrial development. During the 1830 to 1880 period, railway construction linked Southern Louisiana with areas to the east, west, and north.

The Intracoastal Waterway, authorized by the Rivers and Harbors Act of 1942, skirts the Southern Louisiana coast, with a branch extending northward from Morgan City in St. Mary Parish to Port Allen on the Mississippi River opposite Baton Rouge. The Waterway, maintained at a minimum depth of 12 feet and a minimum width of 125 feet, was built to carry barge traffic.

Southern Louisiana also has extensive accommodations for oceangoing vessels. The area has three deepwater ports, New Orleans, Baton Rouge, and Lake Charles, with river and channel approaches adequate for passage of all but the largest ships.

An important modern addition to the transportation facilities of the area is the pipeline. Southern Louisiana now has a dense network of crude oil, natural gas, and petroleum product pipelines proceeding from the area to refining and consuming centers in the northern and northeastern regions of the United States. Figure 4 shows major natural gas pipelines originating in Texas and Louisiana.

The combined effect of these natural and manmade physical features on the present and prospective urban development of the study area will be considered below.

PRESENT POPULATION AND ECONOMIC ACTIVITY PATTERN OF REGION

According to estimates of the Louisiana State Department of Health (LSDH), the 39 parishes of the Southern Louisiana study area had a 1969 population of 2,798,800, roughly three-fourths of the total for the entire State (Table I). Of the aggregate for Southern Louisiana, 1,562,000 persons were estimated to be residents of the area's four large metropolitan areas--1,026,000 in the New Orleans SMSA; 267,000 in the Baton Rouge SMSA; 167,000 in the Lake Charles SMSA; and 102,000 in the Lafayette SMSA. Nonmetropolitan parishes in Southern Louisiana are estimated to have had a combined 1969 population of 1,236,800.

The LSDH estimates may understate the population of faster growing areas and overstate that of others, because of the method of computation used. The estimates are based solely on natural increases (excess of resident births over deaths) and do not

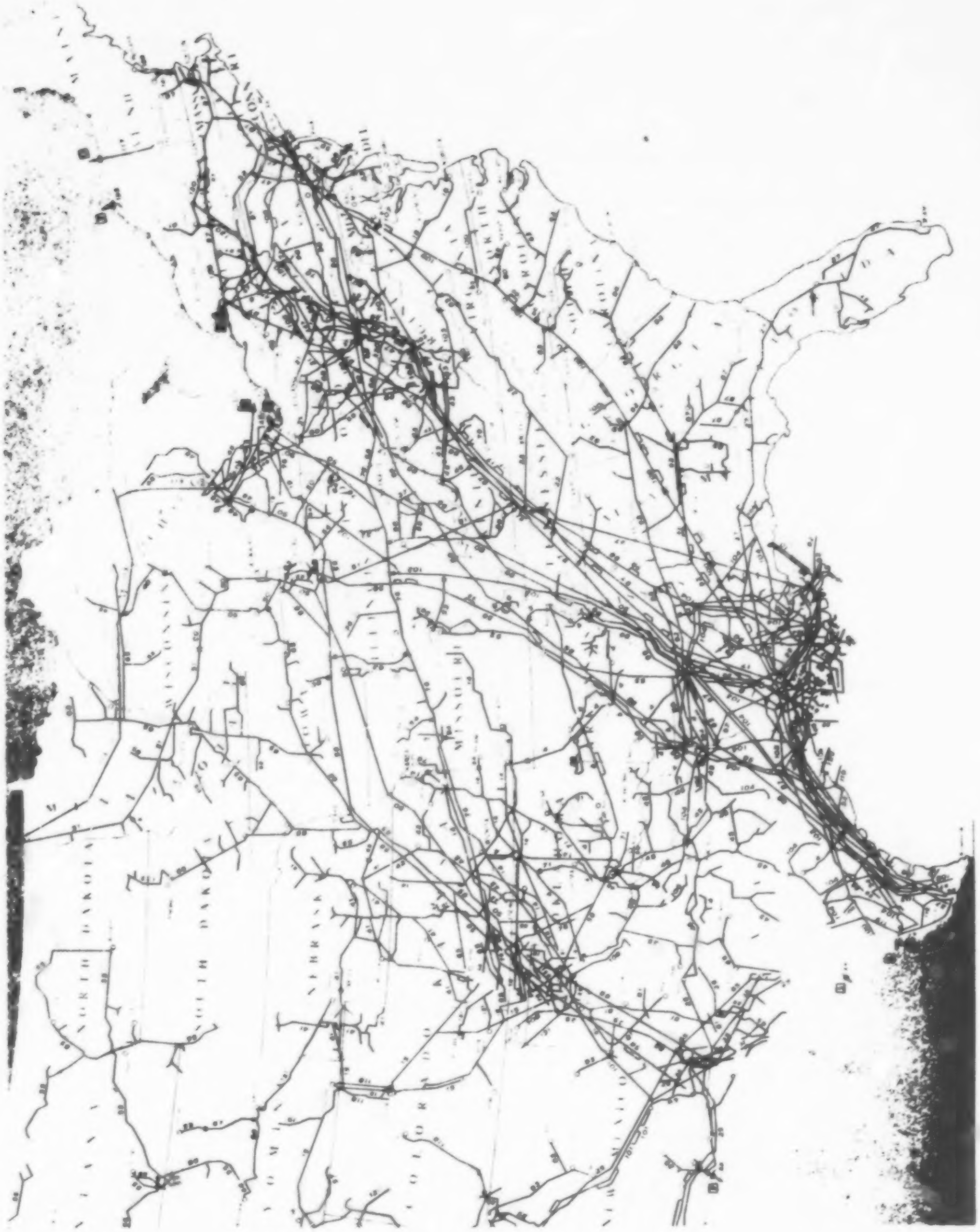

FIGURE 4 - Major Natural Gas Pipelines.

Source: Federal Power Commission.

Table I

Estimated Population of Southern Louisiana Study Area, 1969

	(thousands of persons)
State of Louisiana	3,715
Southern Louisiana (38 Parishes)	2,784
Metropolitan Parishes	1,562
New Orleans SMSA	1,026
Baton Rouge SMSA	267
Lake Charles SMSA	167
Lafayette SMSA	102
Nonmetropolitan Parishes	1,222
Acadia	58
Allen	22
Ascension	33
Assumption	21
Avoyelles	42
Beauregard	21
Cameron	8
East Feliciana	22
Evangeline	36
Iberia	62
Iberville	34
Jefferson Davis	34
La Fourche	67
Livingston	31
Plaquemines	27
Pointe Coupee	25
Rapides	124
St. Charles	26
St. Helena	10
St. James	22
St. John the Baptist	22
St. Landry	94
St. Martin	34
St. Mary	59
Tangipahoa	68
Terrebonne	76
Vermilion	44
Vernon	21
Washington	48
West Baton Rouge	18
West Feliciana	13
Grant	15

Source: Louisiana State Department of Health, Division of Tabulation and Analysis. April 16, 1969.

attempt to take account of migration. Other estimates suggest, for example, that LSDH figures for New Orleans and Baton Rouge may be too low and that for Lake Charles, too high. The U. S. Department of Housing and Urban Development arrives at estimates of New Orleans SMSA and Baton Rouge SMSA populations for 1969 of 1,150,000 and 305,000, respectively,[1/] instead of the LSDH figures of 1,026,000 and 267,000 for the two metropolitan areas. On the other hand, U. S. Census Bureau estimates of current population growth in the Lake Charles SMSA[2/] suggest a 1969 population for Lake Charles in the range of 136,000 - 138,000 instead of the 167,000 estimate obtained by the LSDH computation method.

The existence of four SMSA's in Southern Louisiana, whatever be the actual magnitudes of their present populations, is one measure of the area's urbanization. Another index of urbanization is population density. Figure 5 records average population densities (using LSDH population estimates) for the entire land area of each of the SMSA's and the nonmetropolitan parishes.

[1/] Analysis of the New Orleans, Louisiana, Housing Market, September, 1969; Analysis of the Baton Rouge, Louisiana, Housing Market, November, 1969.

[2/] Projections of the Population of Metropolitan Areas: 1975, Series P-25, No. 415, January 31, 1969.

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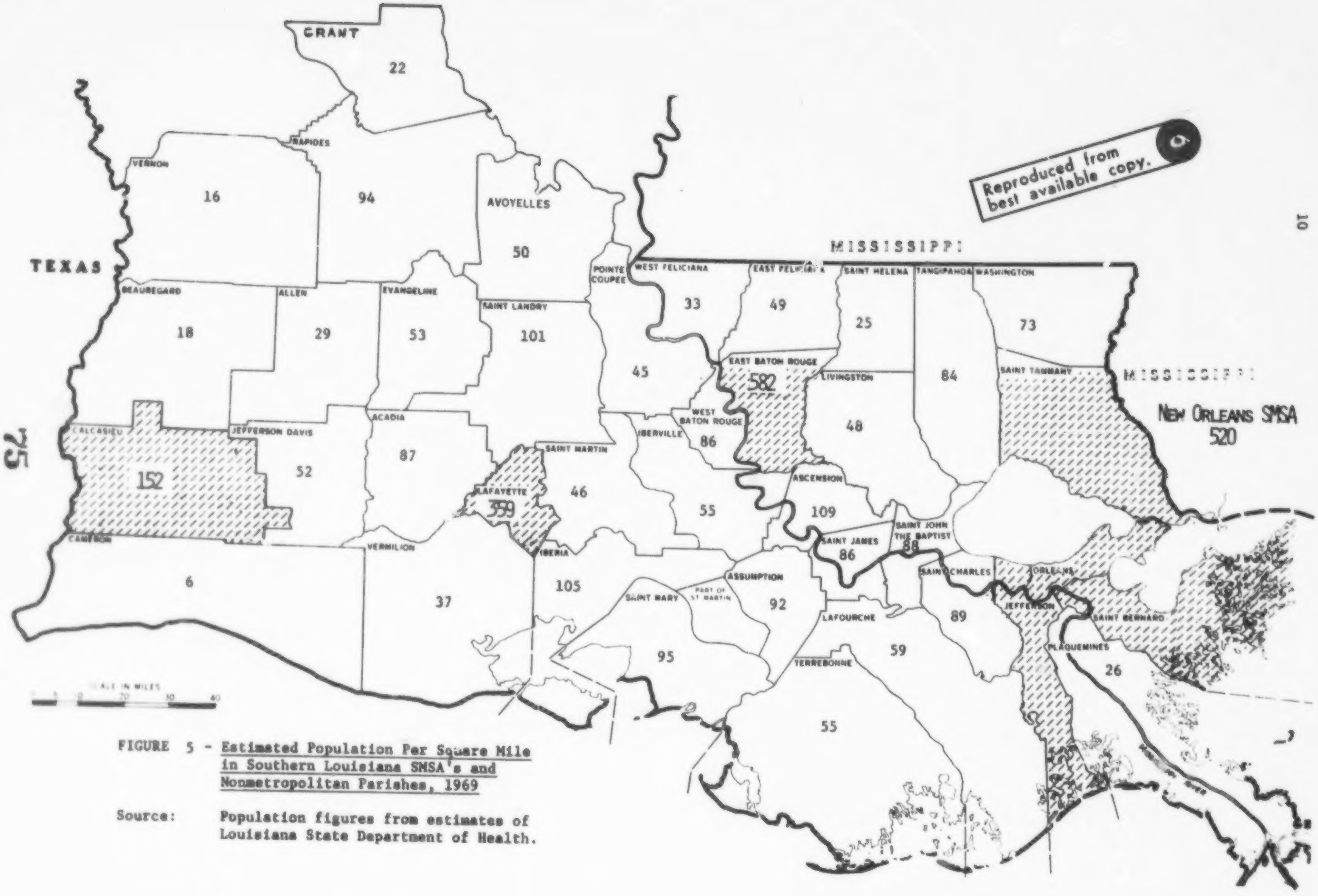

TEXAS
MISSISSIPPI
MISSISSIPPI
New Orleans SMSA
520
GRANT
22
RAPIDES
94
VERNON
16
AVOYELLES
50
BEAUREGARD
18
ALLEN
29
EVANGELINE
53
SAINT LANDRY
101
POINTE COUPEE
45
WEST FELICIANA
33
EAST FELICIANA
49
SAINT HELENA
25
TANGIPAHOA
84
WASHINGTON
73
SAINT TAMMANY
EAST BATON ROUGE
582
LIVINGSTON
48
WEST BATON ROUGE
86
IBERVILLE
55
CALCASIEU
152
JEFFERSON DAVIS
52
ACADIA
87
LAFAYETTE
359
SAINT MARTIN
46
CAMERON
6
VERMILION
37
IBERIA
105
ASCENSION
109
SAINT JAMES
86
SAINT JOHN THE BAPTIST
88
SAINT CHARLES
89
ORLEANS
JEFFERSON
SAINT BERNARD
PLAQUEMINES
26
ASSUMPTION
92
PART OF ST MARTIN
SAINT MARY
95
LAFOURCHE
59
TERREBONNE
55
SCALE IN MILES
0 5 10 20 30 40

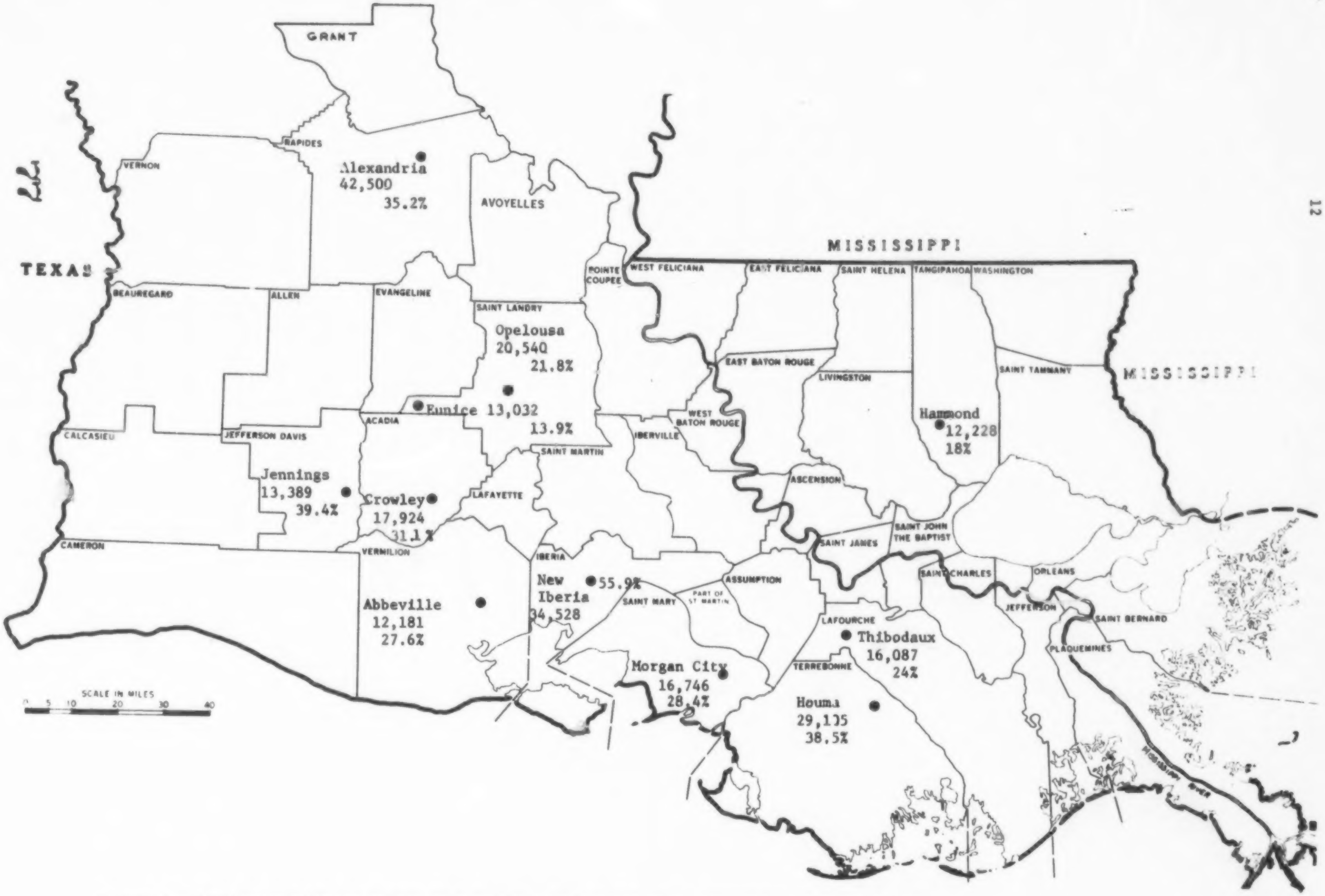
FIGURE 5 - Estimated Population Per Square Mile in Southern Louisiana SMSA's and Nonmetropolitan Parishes, 1969

Source: Population figures from estimates of Louisiana State Department of Health.

The figure, of course, confirms that New Orleans, Baton Rouge, Lafayette, and Lake Charles are urbanized with high to moderate population densities. In addition, it suggests considerable urbanization in eleven other parishes (Ascension, Iberia, St. Landry, St. Mary, Rapides, Assumption, St. Charles, St. John the Baptist, Acadia, St. James, and Tangipahoa).

A third index of urbanization is the extent to which population is concentrated in the principal cities other than the four SMSA areas. Figure 6 shows LSDH estimates of 1969 population of cities in non-SMSA parishes and the share of total parish population for which they account. It can be seen that nine parishes contain cities of substantial size with populations ranging from 12,181 to 34,528. In three parishes--Iberia, Terrebonne, and Jefferson Davis--principal cities account for a major portion of their parish populations. These cities--New Iberia, Houma, and Jennings--account for 60, 39, and 39 percent of their respective parish populations.

A fourth indicator of urbanization is the proportion of employment in occupations other than agriculture and mining. By this measure, as shown in Table II for 1967, only two parishes, Plaquemines and Point Coupee, are dominantly nonurban because of relatively high proportions of employment in farming and mining. In Plaquemines Parish, 44.5 percent of the employed population is engaged in mining. Pointe Coupee Parish, on the other hand,


MISSISSIPPI
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TEXAS
GRANT
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VERNON
AVOYELLES
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WEST FELICIANA
EAST FELICIANA
SAINT HELENA
TANGIPAHOA
WASHINGTON
BEAUREGARD
ALLEN
EVANGELINE
SAINT LANDRY
EAST BATON ROUGE
LIVINGSTON
SAINT TAMMANY
WEST BATON ROUGE
IBERVILLE
ACADIA
JEFFERSON DAVIS
CALCASIEU
SAINT MARTIN
ASCENSION
LAFAYETTE
SAINT JAMES
SAINT JOHN THE BAPTIST
CAMERON
VERMILION
IBERIA
ASSUMPTION
SAINT CHARLES
ORLEANS
SAINT MARY
PART OF ST MARTIN
JEFFERSON
SAINT BERNARD
LAFOURCHE
PLAQUEMINES
TERREBONNE
MISSISSIPPI RIVER
Alexandria
42,500
35.2%
Opelousa
20,540
21.8%
Eunice 13,032
13.9%
Hammond
12,228
18%
Jennings
13,389
39.4%
Crowley
17,924
31.1%
New
Iberia
34,528
55.9%
Abbeville
12,181
27.6%
Thibodaux
16,087
24%
Morgan City
16,746
28.4%
Houma
29,105
38.5%
SCALE IN MILES
0
5
10
20
30
40

FIGURE 6 - Population of Major Cities in Non-SMSA Parishes and Their Proportion of Total Parish Populations, Southern Louisiana Study Area, 1969.

Source of Population Figures: Louisiana State Department of Health.

Table II

Distribution of Employment in Agriculture, Mining and Nonfarm Occupations other than Mining, Southern Louisiana Parishes, 1967 1/

(Percent of Total Employment)

	Agriculture	Mining	Agriculture and Mining	Nonfarming Occupations other than Mining
Metropolitan Parishes				
New Orleans SMSA	.2	3.4	3.6	96.4
Baton Rouge SMSA	1.1	.4	1.5	98.5
Lake Charles SMSA	2.1	2.8	4.9	95.1
Lafayette SMSA	11.0	11.5	22.5	77.5
Nonmetropolitan Parishes				
Acadia	18.8	3.9	22.7	77.3
Allen	7.9	.9	8.8	91.2
Ascension 2/	.1	1.4	1.5	98.5
Assumption 2/	0.0	10.0	10.0	90.0
Avoyelles 2/	1.8	3/		
Beauregard 2/	.6	5.1	5.7	94.3
Cameron	8.5	13.2	21.7	78.3
East Feliciana 2/	0.0	0.0	0.0	100.0
Evangeline	29.9	1.5	31.4	68.6
Iberia 2/	.3	17.4	17.7	82.3
Iberville	11.0	1.8	12.8	87.2
Jefferson Davis 2/	3/	7.5		
La Fourche	2.7	19.1	21.8	78.2
Livingston	10.8	.5	11.3	88.7
Plaquemines 2/	.8	44.5	45.3	54.7
Pointe Coupee	33.5	4.9	38.4	61.6
Rapides 2/	.5	.6	1.1	98.9
St. Charles	4.2	2.1	6.3	93.7
St. Helena	0.0	0.0	0.0	100.0
St. James	17.0	.7	17.7	82.3
St. John the Baptist	14.9	.6	15.5	84.5
St. Landry	19.0	6.5	25.5	74.5
St. Martin	21.7	5.4	27.1	72.9
St. Mary 2/	1.8	26.6	28.4	71.6
Tangipahoa	19.6	.8	20.4	79.6
Terrebone	.9	21.5	22.4	77.6
Vermilion	16.9	5.3	22.2	77.8
Vernon 2/	3/	3/		
Washington	.4	1.7	2.1	97.9
West Baton Rouge	3/	3/		
West Feliciana 2/	0.0	3/		

1/ Source: Louisiana Division of Employment Security, Louisiana Labor Force Information, Statewide and Selected Areas, July 1967.

2/ Source: U. S. Department of Commerce, Bureau of the Census, County Business Patterns, 1967.

3/ Figures withheld to avoid disclosure of operations of individual reporting units.

derives its nonurban character by virtue of the fact that 33.5 percent of its employed population is engaged in farming. All other parishes are urban in the sense that from 70 to 100 percent of employed persons are in non-farming, non-mining occupations.

The nature as well as the extent of urbanization in the study area is broadly described by available information on the distribution of personal income by major sources. Data for 1967 are presented in Table III for 19 parishes in the Southern Louisiana area, and compared with similar information for all U. S. metropolitan areas. The 19 parishes include 12 Mississippi River parishes (Jefferson, Orleans, St. Bernard, St. Tammany, Ascension, Iberville, Plaquemines, St. Charles, St. James, St. John the Baptist, West Baton Rouge and East Baton Rouge) and seven Gulf Intracoastal Waterway parishes (Calcasieu, Cameron, Iberia, Lafayette, St. Mary, Jefferson Davis, and Vermilion).

A significant aspect of the economy of the 19 Southern Louisiana parishes is the relatively high proportion (16.5 percent) of total personal income derived in the form of property income. The comparable ratio for all U.S. metropolitan areas is 14.5 percent.

Among the sources of earned income, the Southern Louisiana parishes obtain a markedly higher proportion of personal income from mining (5.6 percent) than do all U. S. SMSA's (0.5 percent), and a somewhat higher proportion from farming (1.3 percent) than

Table III

Sources of Personal Income for 19 Parishes in Southern Louisiana and all Metropolitan Areas in the U. S. - 1967

(Percent of Total Personal Income)

	19 Southern Louisiana Parishes*	All U. S. Metropolitan Areas
Total Personal Income	100.0	100.0
Property Income	16.5	14.5
Transfer Payments Less Personal Contributions for Social Insurance	3.9	4.3
Total Earnings	79.6	81.2
Farm Earnings	1.3	.8
Total Nonfarm Earnings	78.3	80.4
Government Earnings	10.6	12.7
Total Federal	3.4	5.8
Federal Civilian	2.4	3.6
Military	1.0	2.1
State and Local	7.2	7.0
Private Nonfarm Earnings	67.7	67.7
Manufacturing	14.8	24.8
Mining	5.6	.5
Contract Construction	9.1	5.0
Transportation, Communication, and Public Utilities	8.4	6.1
Wholesale and Retail Trade	14.3	14.1
Finance, Insurance, and Real Estate	4.1	4.8
Services	11.2	12.3
Other	.2	.2

Source: Unpublished data obtained from the U. S. Department of Commerce.

*Jefferson, Orleans, St. Bernard, St. Tammany, Ascension, Iberville, Plaquemines, St. Charles, St. James, St. John the Baptist, West Baton Rouge, East Baton Rouge, Calcasieu, Cameron, Iberia, St. Mary, Lafayette, Jefferson Davis, and Vermilion.

all U. S. SMSA's (0.8 percent). On the other hand, manufacturing is of significantly lower relative importance (14.8 percent) than in all U. S. SMSA's, where manufacturing accounts for nearly 25 percent of total personal income.

Three of the broad service activities within the 19 Southern Louisiana parishes--government; construction; and transportation, communications, and public utilities--also show a pattern different from the average of U. S. metropolitan areas.

Earnings from government employment--Federal, State, and local--are of lesser significance in Southern Louisiana than in the average U. S. SMSA. However, the transportation, communication, and public utilities sector in Southern Louisiana is of considerably greater importance. Earnings in this sector reflect activities of the ports of New Orleans, Baton Rouge, and Lake Charles; navigation services for oceangoing vessels on the approaches to the ports; and similar services for barge traffic on the Gulf Intracoastal Waterway. Of even greater relative importance among earned income sources in the 19 parishes is contract construction. This category of earnings accounts for more than 9 percent of total personal income in the area, compared to 5 percent for all U. S. metropolitan areas.

A significant portion of the area's construction activity is undoubtedly due to exploration and extraction of Southern Louisiana's mineral resources. In 1967, 2,230 new oil and gas wells, in exploratory locations as well as in proven fields, were drilled in the study area and offshore in the Gulf of Mexico. In addition, major construction work on sulphur mining facilities was undertaken in La Fourche and Plaquemines Parishes and offshore at Grand Isle, near Jefferson Parish.[3/] But mining is far from being the sole source of the area's unusual level of construction activity. The steady expansion in manufacturing facilities for the region's dominant industries--oil refining and petrochemicals manufacturing--all of which require extensive plant and equipment, has led to high levels of construction activity.

Figures 7-a, 7-b, 7-c, 7-d, 7-e, and 7-f depict the 1969 concentration of plants operated by major national corporations in the industrial corridor along the Mississippi River between Baton Rouge and New Orleans. Among the petroleum and petrochemical plants lining the corridor is one of the world's largest oil refineries (a plant located in Baton Rouge). The succession of petrochemical plants in the corridor is described by the New Orleans Chamber of Commerce as the largest such concentration in the world. The corridor is also the location of inorganic chemical industries based on major non-petroleum minerals of the area--sulphur, salt, and lime. In addition,

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[3/] U. S. Department of the Interior, Bureau of Mines, Minerals Yearbook, Volume IV, Area Reports: Domestic, 1967.

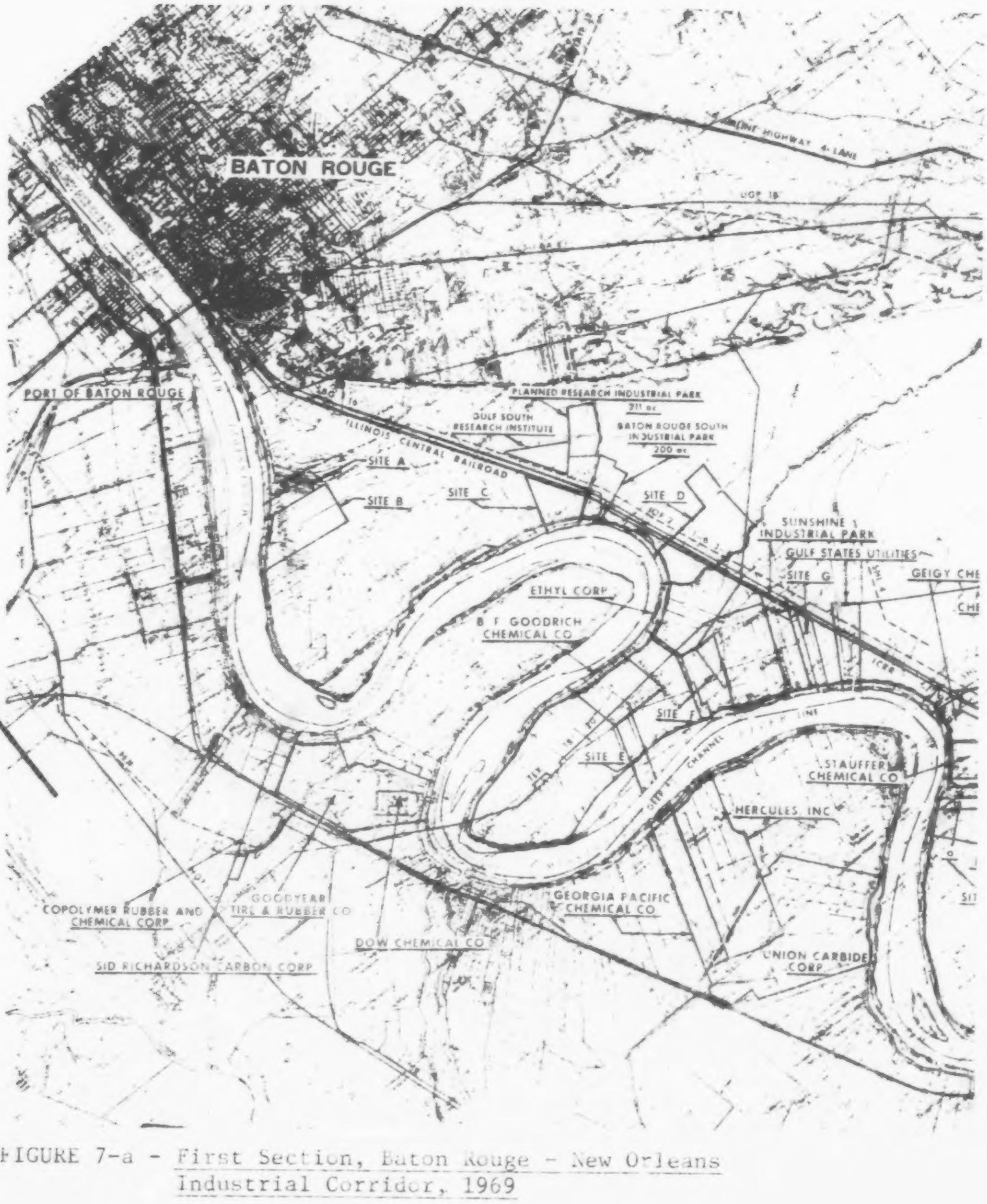
BATON ROUGE
HIGHWAY 4-LANE
PORT OF BATON ROUGE
PLANNED RESEARCH INDUSTRIAL PARK
211 ac
GULF SOUTH RESEARCH INSTITUTE
BATON ROUGE SOUTH INDUSTRIAL PARK
200 ac
ILLINOIS CENTRAL RAILROAD
SITE A
SITE B
SITE C
SITE D
SUNSHINE INDUSTRIAL PARK
GULF STATES UTILITIES
SITE G
GEIGY CHE
ETHYL CORP
B F GOODRICH CHEMICAL CO
SITE F
SITE E
STAUFFER CHEMICAL CO
HERCULES INC
GEORGIA PACIFIC CHEMICAL CO
UNION CARBIDE CORP
COPOLYMER RUBBER AND CHEMICAL CORP
GOODYEAR TIRE & RUBBER CO
DOW CHEMICAL CO
SID RICHARDSON CARBON CORP
N

FIGURE 7-a - First Section, Baton Rouge - New Orleans Industrial Corridor, 1969

Source: Illinois Central Railroad.

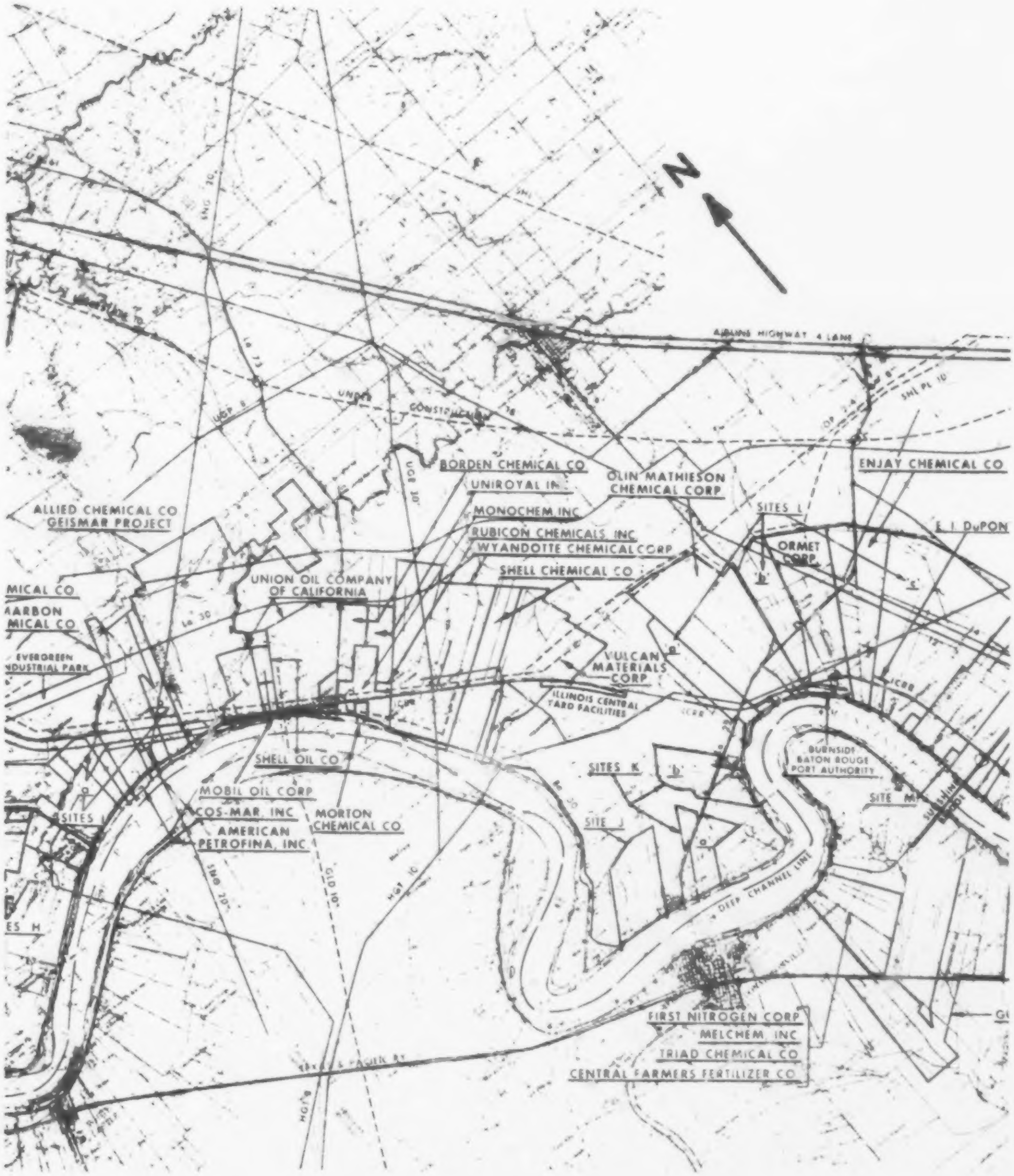
N
AIRLINE HIGHWAY 4 LANE
UNDER CONSTRUCTION
BORDEN CHEMICAL CO
UNIROYAL INC
MONOCHEM INC
RUBICON CHEMICALS INC
WYANDOTTE CHEMICAL CORP
SHELL CHEMICAL CO
OLIN MATHIESON CHEMICAL CORP
ENJAY CHEMICAL CO
SITES L
E I DuPON
ORMET CORP
ALLIED CHEMICAL CO GEISMAR PROJECT
UNION OIL COMPANY OF CALIFORNIA
MICAL CO
MARBON MICAL CO
EVERGREEN INDUSTRIAL PARK
VULCAN MATERIALS CORP
ILLINOIS CENTRAL YARD FACILITIES
SHELL OIL CO
MOBIL OIL CORP
COS-MAR, INC
AMERICAN PETROFINA, INC
MORTON CHEMICAL CO
SITES K
SITE J
BURNSIDE BATON ROUGE PORT AUTHORITY
SITE M
SITES I
ES H
DEEP CHANNEL LINE
FIRST NITROGEN CORP
MELCHEM INC
TRIAD CHEMICAL CO
CENTRAL FARMERS FERTILIZER CO

FIGURE 7-b - Second Section, Baton Rouge - New Orleans Industrial Corridor, 1969

Source: Illinois Central Railroad.

Reproduced from best available copy.

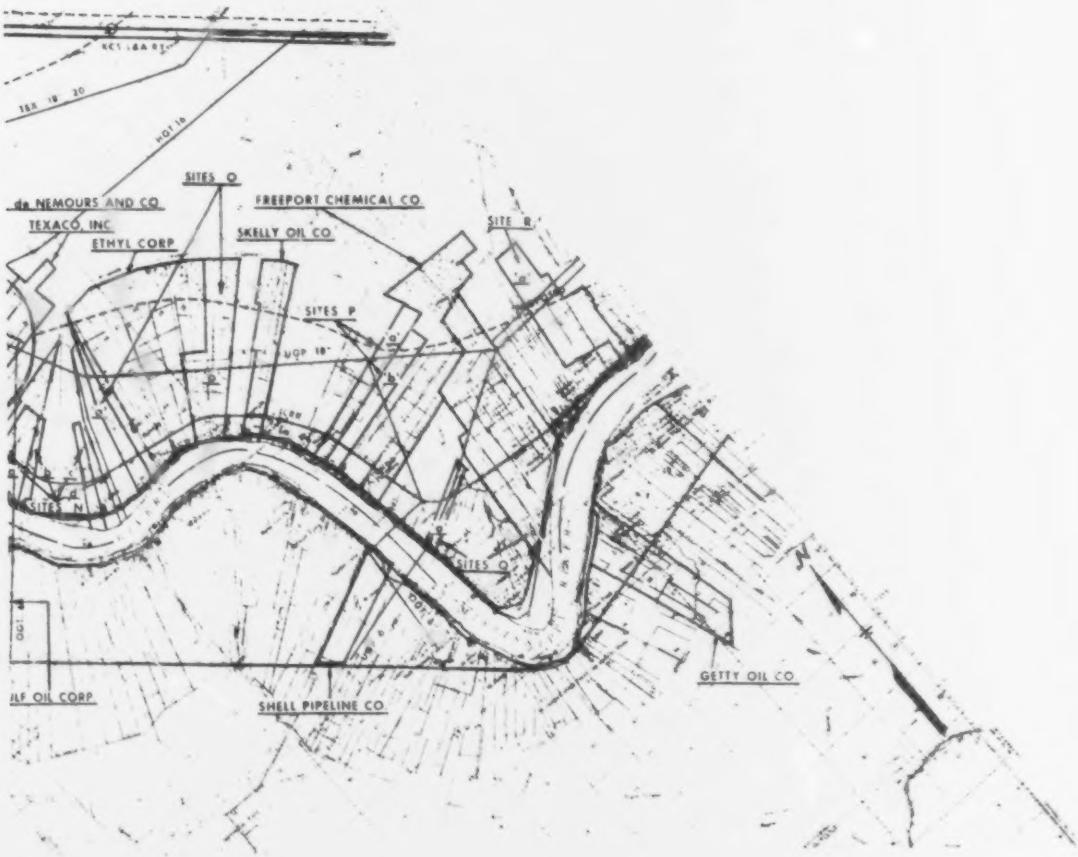
TEX 18 20
HOT 16
SITES O
de NEMOURS AND CO
FREEPORT CHEMICAL CO
TEXACO, INC
ETHYL CORP
SKELLY OIL CO
SITE R
SITES P
UOP 18"
SITES N
SITES Q
N
ULF OIL CORP
SHELL PIPELINE CO
GETTY OIL CO

FIGURE 7-c - Third Section, Baton Rouge - New Orleans Industrial Corridor, 1969

Source: Illinois Central Railroad.

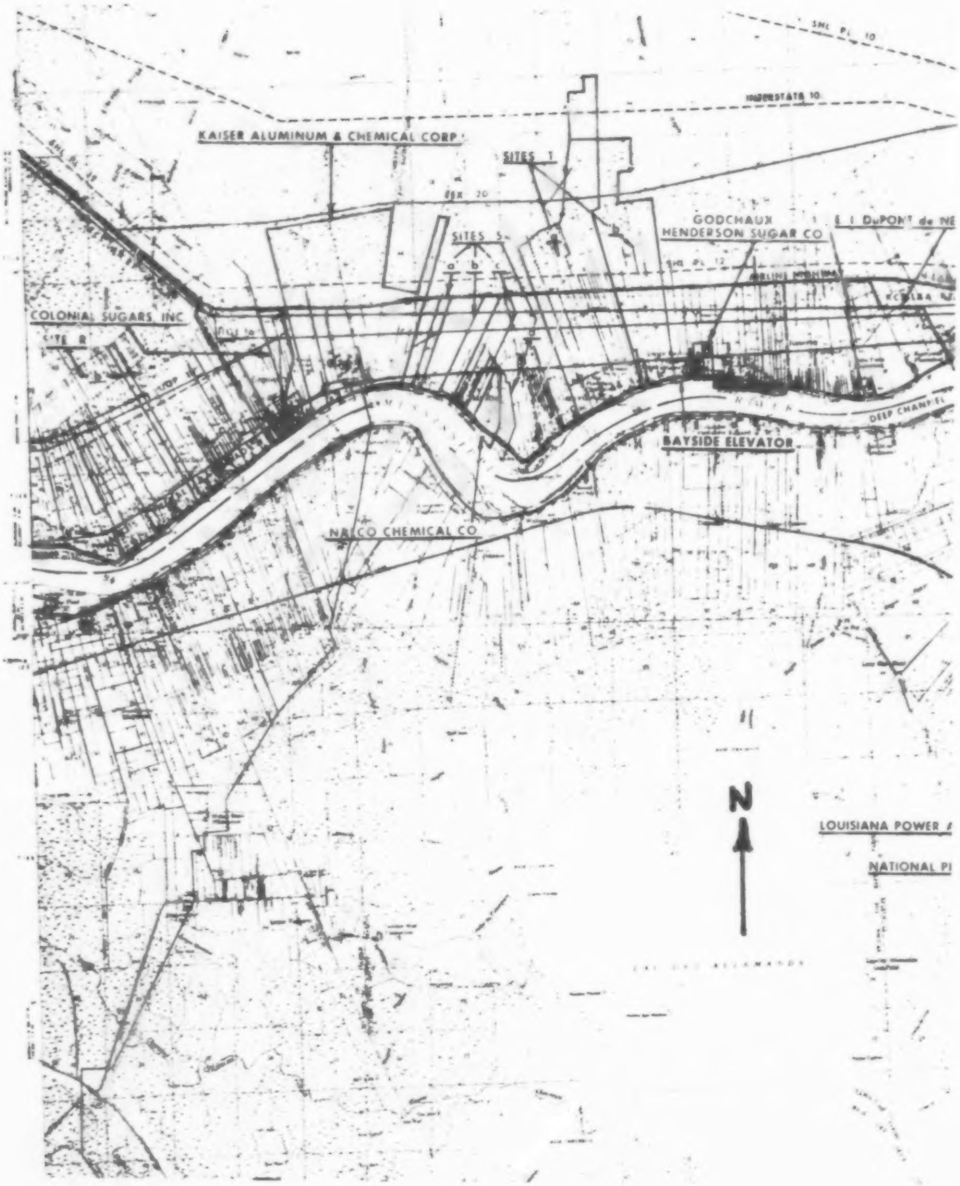
SHL PL 10
INTERSTATE 10
KAISER ALUMINUM & CHEMICAL CORP
SITES 1
SITES 5
a
b
c
GODCHAUX
HENDERSON SUGAR CO
E I DuPONT de NE
SHL PL 12
AIRLINE HIGHWAY
COLONIAL SUGARS INC
SITE R
DEEP CHANNEL
BAYSIDE ELEVATOR
NALCO CHEMICAL CO
N
LOUISIANA POWER
NATIONAL PI

FIGURE 7-d - Fourth Section, Baton Rouge - New Orleans Industrial Corridor, 1969

Source: Illinois Central Railroad.

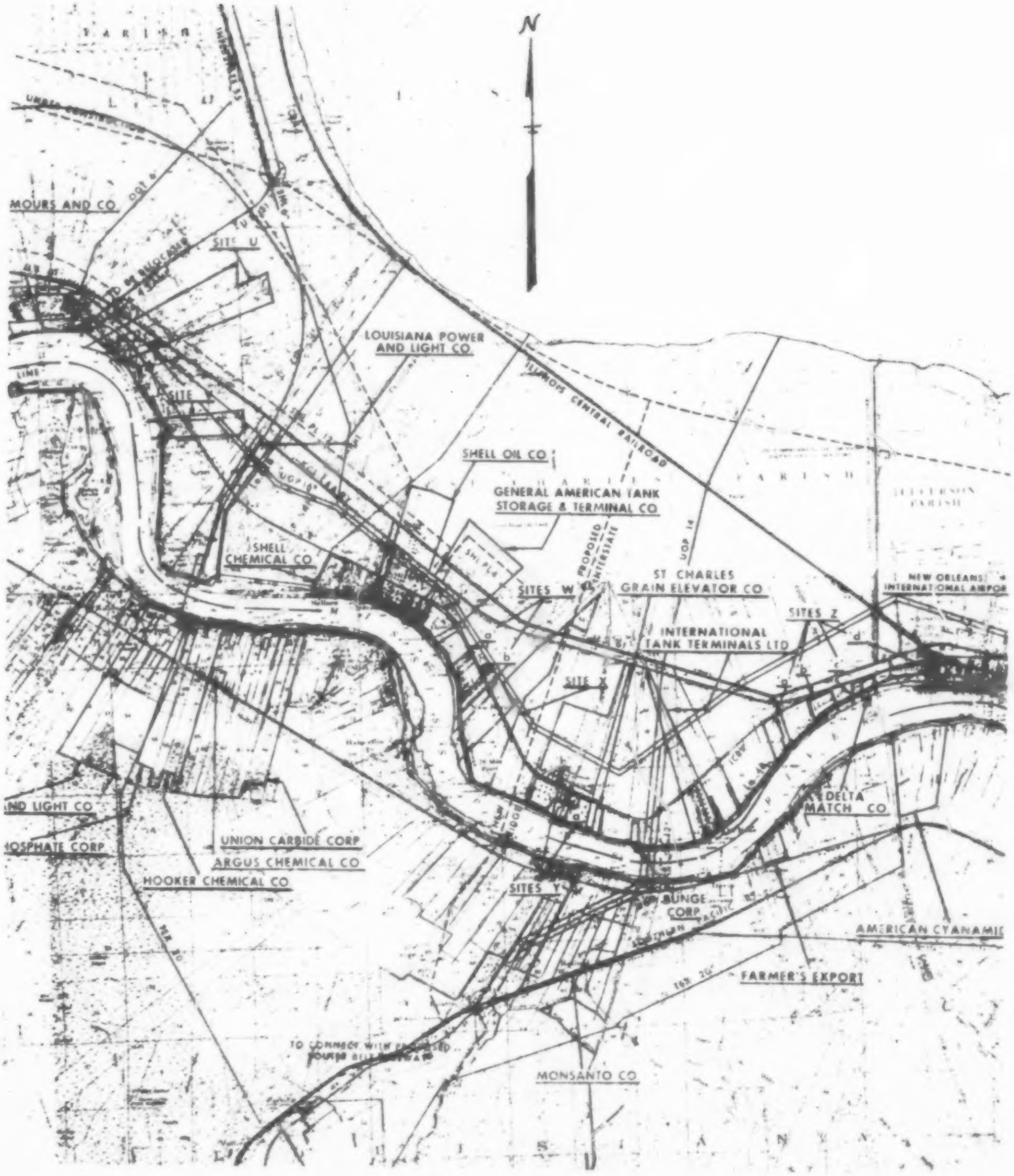
N
MOURS AND CO.
SITE U
LOUISIANA POWER AND LIGHT CO
SITE
SHELL OIL CO
GENERAL AMERICAN TANK STORAGE & TERMINAL CO
ILLINOIS CENTRAL RAILROAD
CHARLES PARISH
JEFFERSON PARISH
SHELL CHEMICAL CO
PROPOSED INTERSTATE
SITES W
ST CHARLES GRAIN ELEVATOR CO
NEW ORLEANS INTERNATIONAL AIRPOR
SITES Z
INTERNATIONAL TANK TERMINALS LTD
SITE X
DELTA MATCH CO
ND LIGHT CO
OSPHATE CORP.
UNION CARBIDE CORP
ARGUS CHEMICAL CO
HOOKER CHEMICAL CO
SITES Y
BUNGE CORP
AMERICAN CYANAMID
FARMER'S EXPORT
TO CONNECT WITH PROPOSED
MONSANTO CO

FIGURE 7-e - Fifth Section, Baton Rouge - New Orleans Industrial Corridor, 1969

Source: Illinois Central Railroad.

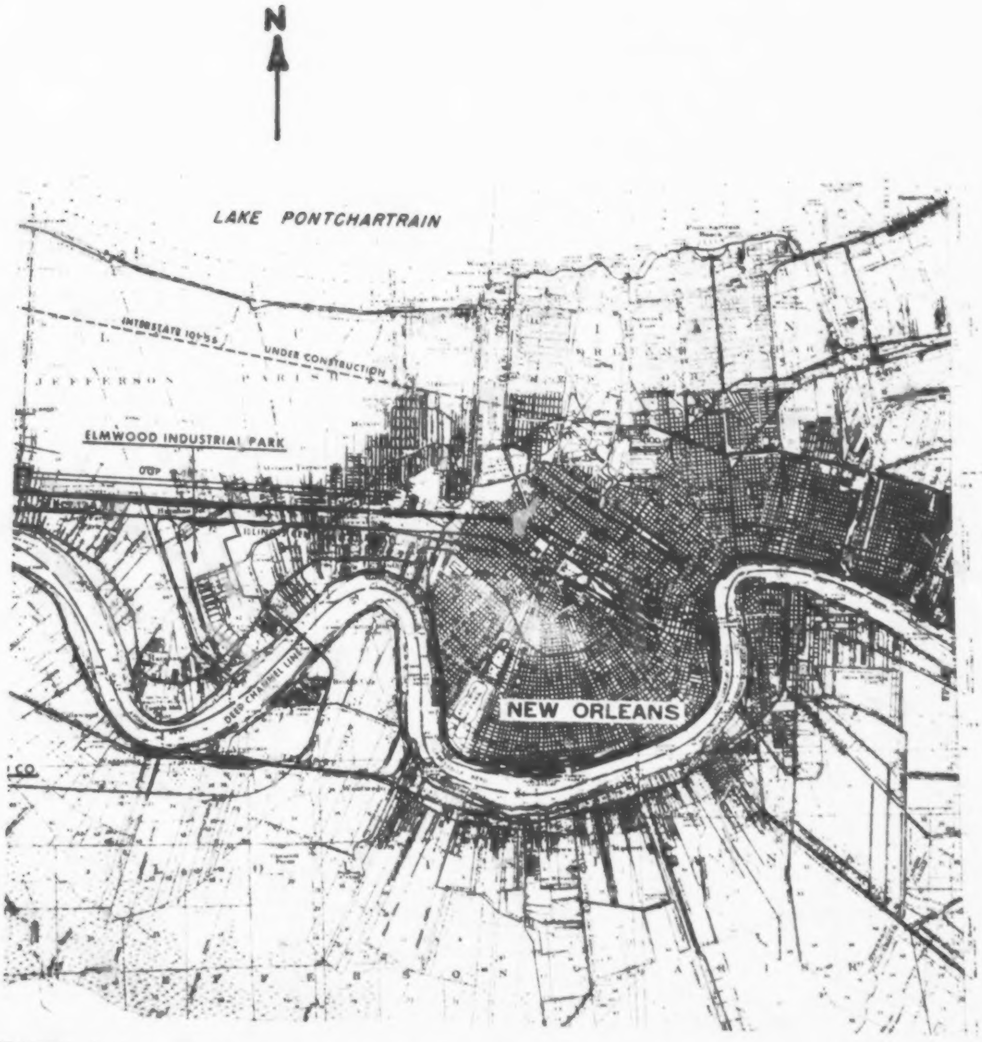
N
LAKE PONTCHARTRAIN
INTERSTATE 10-I-55
UNDER CONSTRUCTION
JEFFERSON PARISH
ELMWOOD INDUSTRIAL PARK
ILLINOIS CENTRAL
DEEP CHANNEL LINE
NEW ORLEANS

FIGURE 7-f - Sixth Section, Baton Rouge - New Orleans Industrial Corridor, 1969

Source: Illinois Central Railroad.

the major primary metals industry of the area--aluminum production--is in the corridor. One of the facilities is the Nation's largest aluminum reduction plant. Bauxite ore for the industry does not exist in the area, but the deep water Mississippi channel permits boats to bring in ore from Jamaica.

Figure 8 shows a similar, though smaller, area of industrial concentration around the City of Lake Charles in Calcasieu Parish. Located in the western extremity of the study area, the City is closer to the industrial complex of Beaumont-Port Arthur in adjoining Texas than to the Baton Rouge-New Orleans Mississippi corridor.

The volume of manufacturing facilities construction for the petroleum and chemical industries varies from year to year. However, an indication of how much construction can take place in a single year in the Baton Rouge-New Orleans corridor is shown in Table IV. In 1967, construction of $479 million in major new plants or additions was completed or underway.

The dominance of the petroleum and chemicals industries in the Baton Rouge-New Orleans corridor and in the Lake Charles area accounts for the relatively lesser importance of manufacturing as a source of earned income as well as for the relatively greater significance of construction activity in the area. While some of these plants are of such immense scale that employment totals are large, with a number of plants in

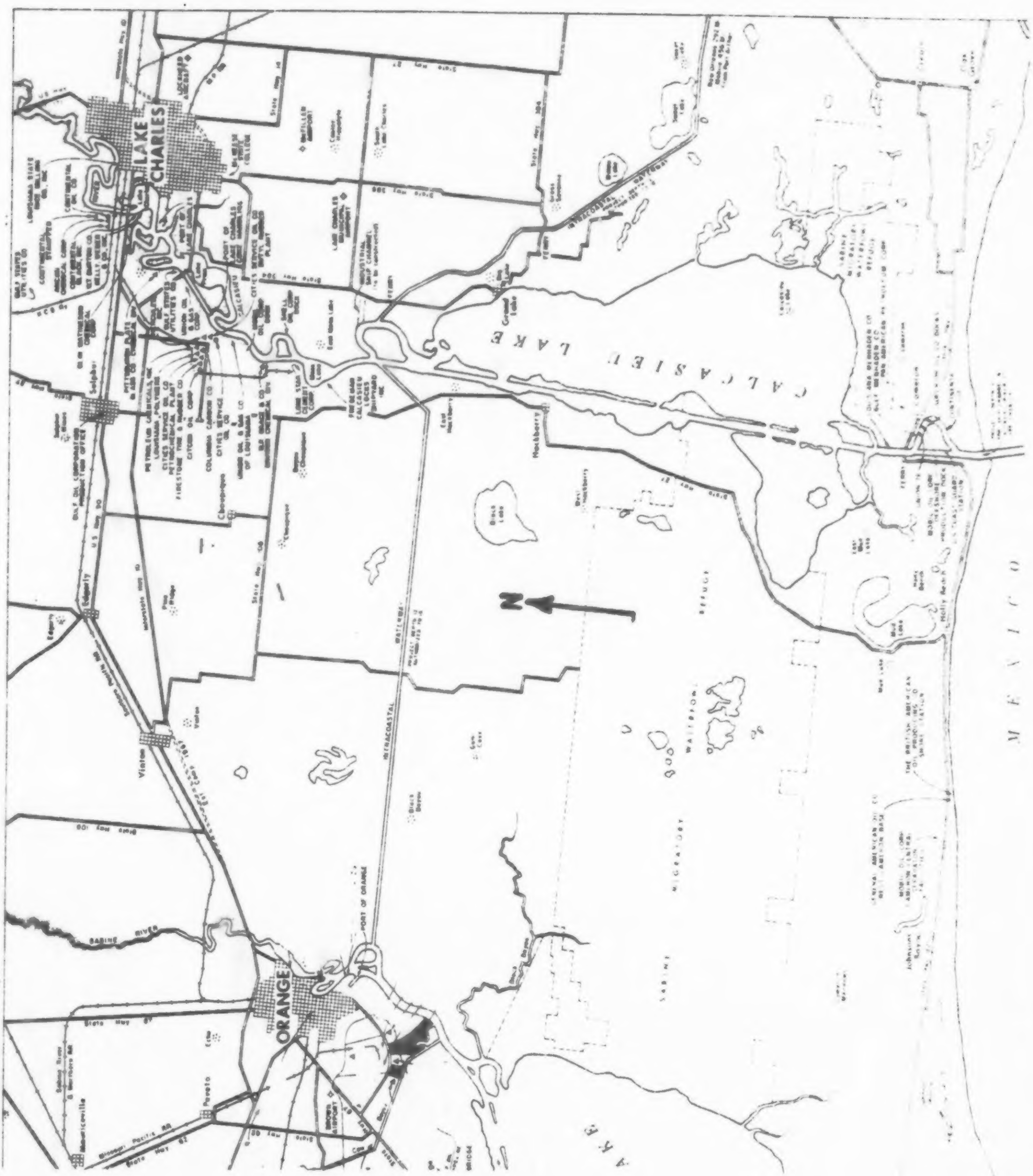
LAKE CHARLES
ORANGE
CALCASIEU LAKE
SABINE RIVER
N
MEXICO

FIGURE 8 - The Lake Charles Industrial Area.

Source: Map prepared by Gulf Oil Corporation.

Table IV

Major Manufacturing Facilities in the Baton Rouge - New Orleans Corridor Completed or Under Construction, 1967

Products or Type of Facility	Estimated Cost of Plant (millions)
Oil refinery	$ 100.0
Phosphoric acid, sulfuric acid, and fluosilic acid	57.0
Tank farm	40.0
Kralastic and latex	25.0
Fertilizer	23.6
Industrial chemicals, petrochemicals, and plastics	53.0
Styrene monomer	20.0
Ethylene oxide and primary alcohol	20.0
Petrochemicals, finishes, resins, and nylon intermediates	37.0
Anhydrous ammonia	16.0
Ammonia	16.0
Methanol and vinyl acetate	13.5
Ammonia and urea	13.0
Caustic soda and chlorine	25.0
Nylon intermediates	5.0
Chlorine and agricultural chemicals	4.5
Urea	5.0
Liquid petroleum gas fractionation	3.0
Industrial solvents	2.4
Total of above	$ 479.0

Source: New Orleans Chamber of Commerce, Growth of the New Orleans Area, 1967.

the over 1,000 and over 2,500 employee category, production is far less dependent on the size of the labor force than in other industries. For example, in 1967, the manufacturing value added per employee in the chemicals industries nationwide was more than $27,000, and in petroleum refining, more than $44,000, compared to about $15,000 in the transportation equipment industry and to some $8,600 in textile mill products.

In addition to the petroleum refining and chemicals industries in the Mississippi Corridor and in the Lake Charles area, data published in the 1970 Louisiana Directory of Manufacturers show that other types of manufacturing, based largely on local resources or on local needs, exist throughout the study area.

The Baton Rouge SMSA (East Baton Rouge Parish) is a center of the fabricated metal products industry. Products include steel pipes, tanks, smokestacks, metal culverts, ducts, and portable buildings. Smaller but significant industries include food products, concrete products, and machinery and machine parts.

The industry of the New Orleans SMSA differs from that of the Baton Rouge metropolitan area by being more diverse and generally larger in scale. The largest establishments in the four-parish area (Orleans, Jefferson, St. Bernard, and St. Tammany) are an aluminum refining and petroleum coke plant in St. Bernard Parish and an oil drilling rig manufacturing plant in Jefferson Parish. Each of these plants employs more than 2,500 persons. Contractor-operated facilities comprising the National Aeronautics and Space Administration's complex at Michoud employ a total of about 7,000 persons.

Plants with more than 500 employees each include a fiber and metal can factory, a barge and supply vessel establishment, a ship repair and conversion facility, three men's apparel and accessory plants, a brewery, and a factory producing fabricated structural steel for buildings, derricks, and marine equipment. Others in this group are a clothing factory, a building board and tile plant, an asbestos cement pipe and shingle company, a metal container plant, a prestressed concrete products company, and a sugar refinery.

Plants employing more than 250 persons each include a twine mill, five apparel plants, four food products establishments, a glass container factory, a cement plant, a fabricated structural steel plant, and an asbestos siding and clapboard factory, a glass jar and bottle factory, a shellfish processing plant, a commercial detergent company, a dairy products company, and a barge and boat construction and repair plant.

Outside the Baton Rouge and New Orleans SMSA's, all the study area parishes have some manufacturing activity; a few have sizable industrial centers. Figure 9, based on a study of information contained in the 1970 Louisiana Directory of Manufacturers, sets forth the principal industries in each parish.

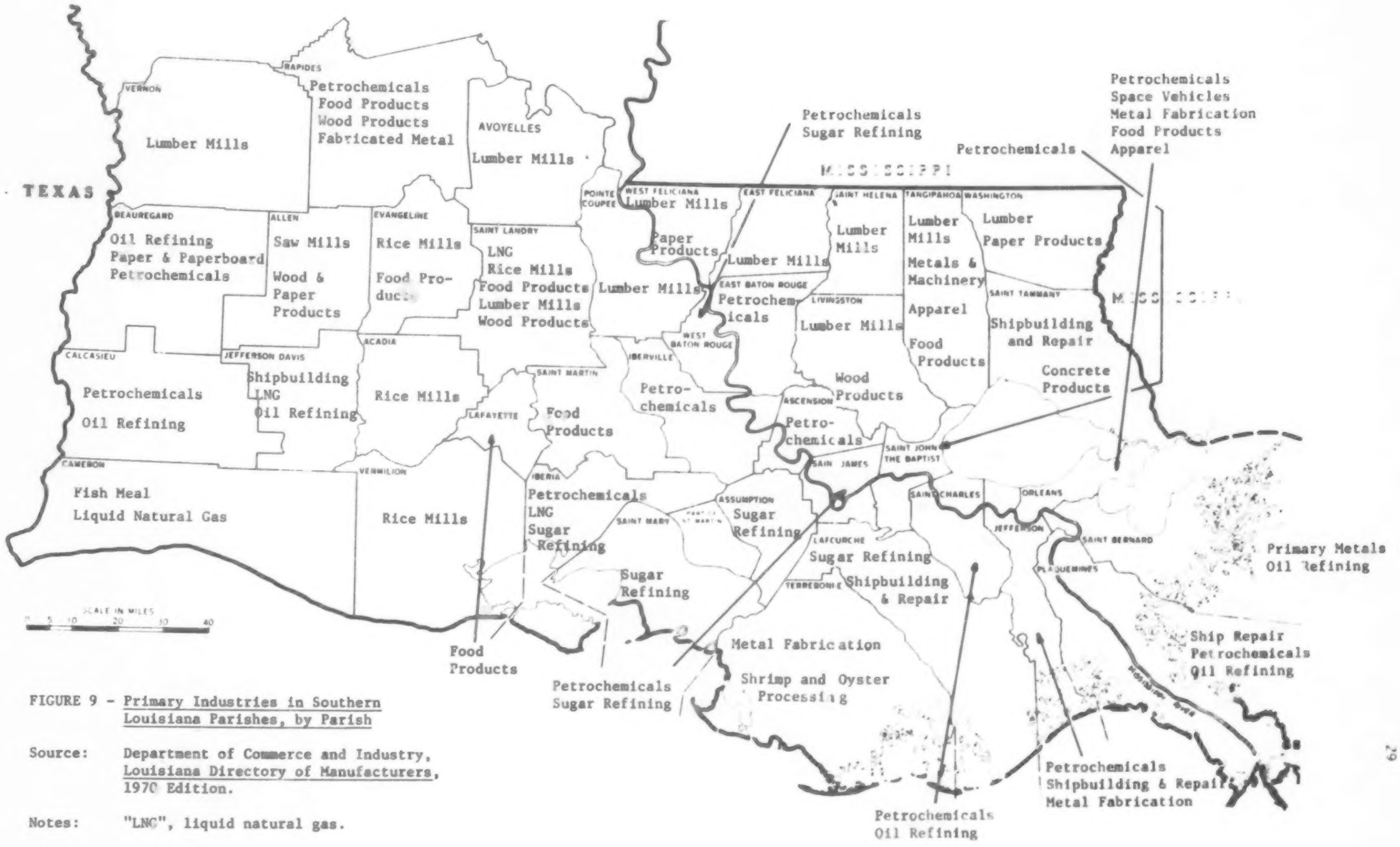
TEXAS
MISSISSIPPI
VERNON
Lumber Mills
RAPIDES
Petrochemicals
Food Products
Wood Products
Fabricated Metal
AVOYELLES
Lumber Mills
BEAUREGARD
Oil Refining
Paper & Paperboard
Petrochemicals
ALLEN
Saw Mills
Wood &
Paper
Products
EVANGELINE
Rice Mills
Food Products
SAINT LANDRY
LNG
Rice Mills
Food Products
Lumber Mills
Wood Products
POINTE COUPEE
Lumber Mills
WEST FELICIANA
Lumber Mills
Paper Products
EAST FELICIANA
Lumber Mills
SAINT HELENA
Lumber Mills
TANGIPAHOA
Lumber Mills
Metals & Machinery
Apparel
Food Products
WASHINGTON
Lumber
Paper Products
SAINT TAMMANY
Shipbuilding and Repair
Concrete Products
EAST BATON ROUGE
Petrochemicals
WEST BATON ROUGE
LIVINGSTON
Lumber Mills
Wood Products
CALCASIEU
Petrochemicals
Oil Refining
JEFFERSON DAVIS
Shipbuilding
LNG
Oil Refining
ACADIA
Rice Mills
SAINT MARTIN
Food Products
LAFAYETTE
IBERVILLE
Petrochemicals
ASCENSION
Petrochemicals
SAINT JOHN THE BAPTIST
SAINT JAMES
CAMERON
Fish Meal
Liquid Natural Gas
VERMILION
Rice Mills
IBERIA
Petrochemicals
LNG
Sugar
Refining
SAINT MARY
SAINT MARTIN
Sugar Refining
ASSUMPTION
Sugar Refining
LAFOURCHE
Sugar Refining
Shipbuilding & Repair
TERREBONNE
Metal Fabrication
Shrimp and Oyster Processing
SAINT CHARLES
ORLEANS
JEFFERSON
SAINT BERNARD
PLAQUEMINES
Petrochemicals
Sugar Refining
Petrochemicals
Space Vehicles
Metal Fabrication
Food Products
Apparel
Petrochemicals
Primary Metals
Oil Refining
Ship Repair
Petrochemicals
Oil Refining
Petrochemicals
Shipbuilding & Repair
Metal Fabrication
Petrochemicals
Oil Refining
Petrochemicals
Sugar Refining
Food Products
MISSISSIPPI RIVER
SCALE IN MILES
0 5 10 20 30 40

FIGURE 9 - Primary Industries in Southern Louisiana Parishes, by Parish

Source: Department of Commerce and Industry, Louisiana Directory of Manufacturers, 1970 Edition.

Notes: "LNG", liquid natural gas.

West Baton Rouge and Iberville Parishes contain medium-sized factories (100 - 250 employees) producing raw sugar and blackstrap molasses. Iberville Parish also has a lumber mill which employs over 250 workers. The Parishes of St. James and St. John the Baptist each have large sugar refineries employing more than 500 persons. Ascension and St. James Parishes contain medium-sized clothing factories. Reflecting its coastal location, Plaquemines Parish engages in barge, boat, and ship repair and the production of fish meal.

Along the Gulf Intracoastal Waterway, there are, in addition to the Lake Charles industrial complex of Calcasieu Parish, the Parishes of Cameron, Vermilion, Iberia, St. Mary, Terrebonne, and La Fourche.

In Cameron Parish, there are fish meal plants, a shrimp packing factory, and two natural gas liquids plants. The predominant industry in Vermilion Parish is rice milling with four mills employing over 300 workers.

Iberia Parish is best described in terms of its major city, New Iberia. New Iberia exhibits a great industrial diversity with one medium-sized barge and tug manufacturer, four machine shops specializing in oil field equipment production and repair, two food products companies, two concrete plants, two large producers of raw sugar and molasses, a rice mill, a livestock feedmill, a furniture factory, a fertilizer plant, and a molded pulp products plant.

St. Mary and La Fourche Parishes are major producers of raw sugar and blackstrap molasses. Also of significance in St. Mary are plants engaged in barge construction and repair, shrimp packing, fish meal manufacture, pulverized oyster shell production, and carbon black manufacture. La Fourche Parish has three shrimp processing plants, six barge and shrimp boat factories, and two amphibious tractor manufacturers.

Houma, the principal city of Terrebonne Parish, is a center of heavy industry with plants producing barges and tugs, oil field equipment, and related products such as flow control valves and winches. The City also contains five shrimp and oyster packing plants.

Lafayette Parish contains a large food products plant and a number of small plants including millworks, metal fabricating factories, concrete and concrete products plants, and meat packing and dairy products companies. The neighboring parishes of St. Martin and Acadia are dominated by industries based on agricultural production in the area. St. Martin's major source of manufacturing employment is the food products industry; Acadia has eleven small rice mills and a medium-sized food products company. In Acadia, however, there is also a large plant producing men's clothing.

The industrial profile of the nine northernmost parishes of the Southern Louisiana area--Vernon, Rapides, Avoyelles, Pointe Coupee, West Feliciana, East Feliciana, St. Helena, Tangipahoa, and Washington--reflect the timber resources of the region. In addition to 29 lumber mills in the nine-parish area, plants in Rapides, Washington, and West Feliciana Parishes manufacture linerboard and other paper products.

Rapides Parish is a center of diversified manufacturing. In addition to three lumber mills and a large linerboard factory, the Parish contains a large industrial valve factory; a large poultry packing plant; several sizable meat packing plants; a large raw sugar and molasses producer; and a large synthetic detergent plant. Smaller plants produce furniture and fabricated metal products.

Tangipahoa Parish contains a number of small iron and steel products firms; medium-sized factories producing women's apparel; a food products company; and a poultry packing plant. In Washington Parish, a five-plant complex, owned by a single large firm, produces industrial chemicals, corrugated and solid fiber boxes, paper bags, linerboard, and wrapping paper. West Feliciana Parish contains two paperboard mills and a large food cannery.

PROSPECTIVE POPULATION AND ECONOMIC GROWTH

LSDH estimates of 1969 population in the 38-parish Southern Louisiana study area reflect an annual growth rate of 1.5 percent in the period since the 1960 Census. Should this rate of annual growth continue for a decade, the population of the study area would increase about 17 percent by 1979 to a total of 3,263,000, compared to a 1969 population of 2,784,000 as estimated by LSDH.

Current annual population growth rates in the 38-parish area, estimated on the basis of projections by the U. S. Census Bureau, [4] range from a low of 1.2 percent to a higher figure of 1.5 percent. The higher estimate coincides with that of LSDH, but the lower estimate would mean an increase in population of only 12 percent between 1969 and 1979, to a total in 1979 of 3,123,000.

While these judgments on the study area's future population may be conservative, higher population growth rates may not occur if the present economic structure of the area remains basically unchanged.

As noted by a 1969 report of the Baton Rouge Capital Regional Planning Commission (CRPC), [5] the area's industries require a high capital investment but need a relatively small work force. This is, for example, the case in the chemicals industry in which the Louisiana Department of Commerce has estimated that an investment of more than $100,000 is required for every permanent job created. Where industries of this type are dominant, relatively rapid economic growth can be accompanied by slower employment growth and, therefore, by fewer incentives for in-migration by job seekers and even for retention of present residents. Available economic data appear to indicate that this relationship has existed in the study area in the recent past.

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[4] U. S. Department of Commerce, Bureau of the Census, Projections of the Population of Metropolitan Areas: 1975, Series P-25, No. 415, January 31, 1969.

[5] Capital Regional Planning Commission, The Comprehensive Plan, February 1969.

Table V shows that in the period 1959-67, the 19 Southern Louisiana parishes within the Baton Rouge-New Orleans industrial corridor or adjoining the Intracoastal Waterway had an annual economic growth rate--as measured by total personal income--of 7.0 percent, surpassing that of all U. S. metropolitan areas (6.3 percent), the State of Louisiana as a whole (6.7 percent), and the United States as a whole (6.4 percent). Yet the area's vigorous growth was achieved by rates of population increase estimated as low as 1.2 percent per year.

For two major reasons, it does not appear reasonable to assume that a major structural change will occur in the economy of the area over any short term in the period ahead.

First, increases in demand for an important portion of the

Table V

Total Personal Income in 19 Southern Louisiana Parishes and the State of Louisiana Compared to Totals for U.S. Metropolitan Areas and the U.S. as a whole, 1959 and 1967

	1959 (millions of dollars)	1967 (millions of dollars)	Percent Increase 1959-67	Annual Percentage Growth Rate
United States as a Whole	380,963	625,068	64.1	6.4
State of Louisiana	5,344	8,995	68.3	6.7
All U. S. Metropolitan Areas	290,062	473,246	63.2	6.3
19 Southern Louisiana Parishes*	3,280	5,605	70.9	7.0

Sources: U. S. Department of Commerce, "Personal Income by States and Regions in 1967," Survey of Current Business, August 1968, pp. 13 - 24 and "Metropolitan Area Income in 1967," Survey of Current Business, May 1969, Part I, pp. 13 - 33.

Data on 19 Southern Louisiana Parishes are unpublished analyses obtained from the U. S. Department of Commerce.

*Jefferson, Orleans, St. Bernard, St. Tammany, Ascension, Iberville, Plaquemines, St. Charles, St. James, St. John the Baptist, West Baton Rouge, East Baton Rouge, Calcasieu, Cameron, Iberia, St. Mary, Jefferson Davis, Lafayette, and Vermilion.

study area's manufacturing output--petroleum and chemical products--appear certain. Requirements for gasoline, jet fuel, and fuel oil can be expected to expand steadily. Demands for chemicals, and particularly petrochemicals, are accelerating, as new uses and the expansion of traditional uses broaden markets. The very high ratios of investment in research by the industry promise a continuation of this trend.

Secondly, the prospects for employment growth are less assured. As noted above, the technology of the petroleum and chemicals industries permits volume production with a relatively small work force. Even greater economies in the use of labor are likely over time. Between 1959 and 1969, for example, the U. S. chemicals industry increased physical output nearly two and one-half times with less than 25 percent additional employee manhours. Employment growth which does accompany expansion in petroleum and chemicals output can be affected in a major way by temporary or permanent shifts in the demand-supply situation in world as well as national markets. As an instance, a glut in the supply of agricultural fertilizers may drastically reduce demand for sulphuric acid, an important product of the chemicals industry in the study area, and in turn reduce the area's sulphur mining output.

Added to these factors which may inhibit employment and population growth in the study area, is the vulnerability of employment connected directly and indirectly with the assembly of spacecraft at the Michoud Assembly Center.

Current employment date indicate that the existing high degree of industrialization and new plant construction in the study area have been insufficient to absorb all of the present increases in the labor force. According to the U. S. Department of Labor, unemployment rates of 6 percent or more have persisted for varying long periods in fourteen parishes (Acadia, Allen, Ascension, Assumption, Avoyelles, Evangeline, Livingston, Pointe Coupee, Saint Helena, Saint Landry, Saint Martin, Rapides, Tangipahoa, and West Feliciana). Although temporary factors may be responsible, Calcasieu, Plaquemines, and Vermilion Parishes were also recently added to this group having substantial unemployment.[6/]

The navigable waterways of the study area--particularly the Mississippi River and the Intracoastal Waterway--and the railroad network have been major determinants of plant location and urban development in the past. While they will continue to exert strong influence, the Capital Regional Planning Commission believes that in the future, highways will have the strongest impact on development.[7/] Should this judgment be borne out, an intensified

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[6/] U.S. Department of Labor, Area Trends in Employment and Unemployment, February 1970, and press release dated April 1, 1970.

[7/] The Comprehensive Plan, op. cit.

urbanization of the interior of the study area could take place. As Figure 10 shows, Interstate-10 when completed will link the metropolitan areas of Baton Rouge, New Orleans, Lafayette, and Lake Charles with 15 of the 38 study area parishes. Major north-south highways, connecting with the Interstate-10 east-west lateral, may enhance the attractiveness for industry of the study area.

Economic growth in Southern Louisiana will require additions to electric power supply. Major additions may be needed if heavy power-consuming industries like aluminum refining expand and rely upon purchased energy. According to information reported to the Federal Power Commission, utility companies in Southern Louisiana are planning about 16,500 megawatts of added capacity in major new generating units by 1980.

To date, natural gas has been both readily available and cheap so that it has served as virtually the only fuel for power generation in the area. However, a rapidly escalating national demand for the gas for higher priority and higher profit uses has led untility companies in the South Central Region to consider plants using other fuels. One of the units planned in the Southern Louisiana area may be nuclear.[8]

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[8] South Central Regional Advisory Committee, Electric Power in the South Central Region, 1970, 1980, 1990, A Report to the Federal Power Commission, February 1969.

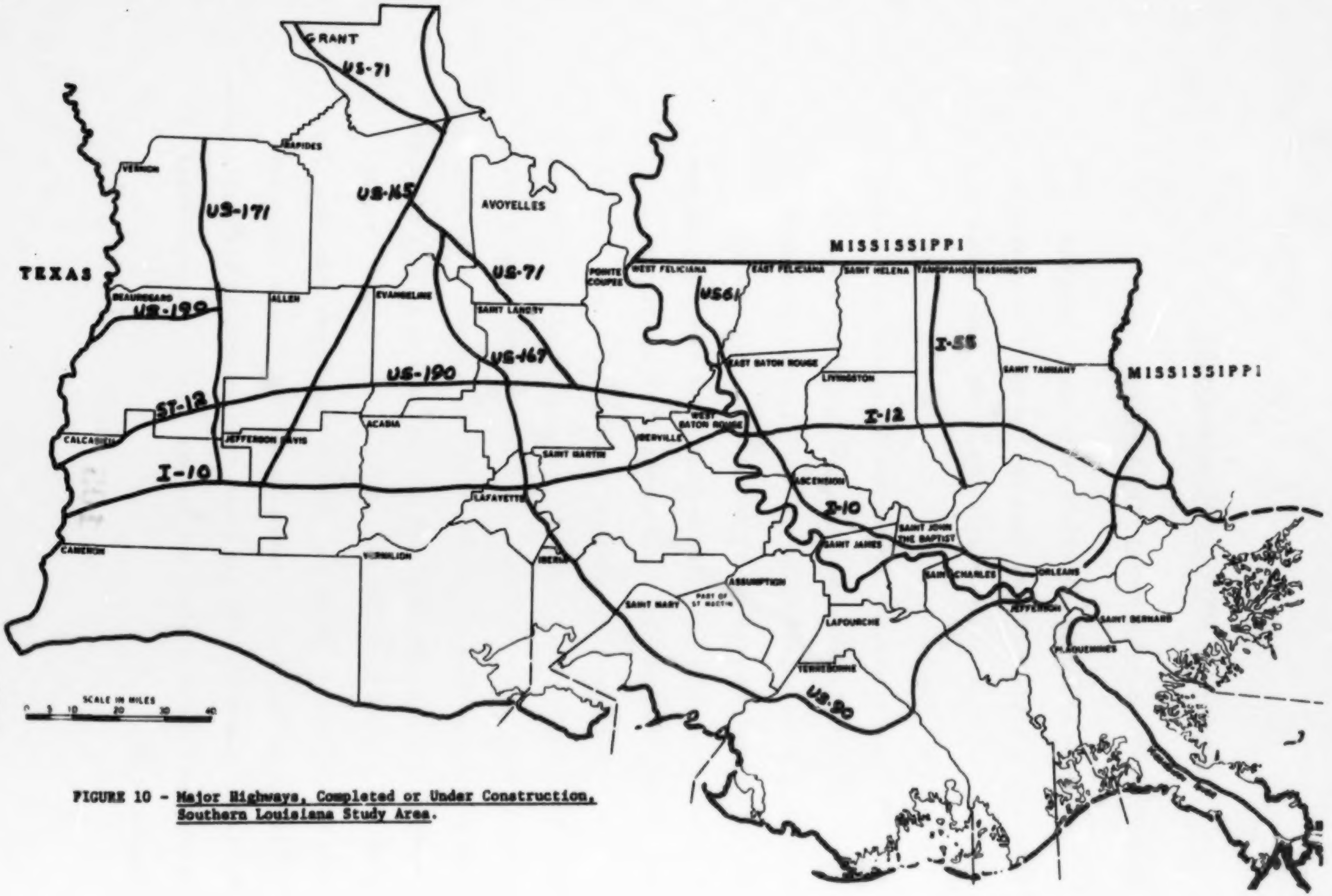

GRANT
US-71
RAPIDES
VERNON
US-171
US-165
AVOYELLES
TEXAS
US-71
POINTE COUPEE
WEST FELICIANA
MISSISSIPPI
EAST FELICIANA
SAINT HELENA
TANGIPAHOA
WASHINGTON
US61
I-55
BEAUREGARD
US-190
ALLEN
EVANGELINE
SAINT LANDRY
US-167
EAST BATON ROUGE
LIVINGSTON
SAINT TAMMANY
MISSISSIPPI
US-190
ST-12
I-12
WEST BATON ROUGE
CALCASIEU
JEFFERSON DAVIS
ACADIA
IBERVILLE
SAINT MARTIN
I-10
LAFAYETTE
ASCENSION
I-10
SAINT JOHN THE BAPTIST
SAINT JAMES
CAMERON
VERMILION
IBERIA
SAINT CHARLES
ORLEANS
SAINT MARY
PART OF ST MARTIN
ASSUMPTION
JEFFERSON
SAINT BERNARD
LAFOURCHE
PLAQUEMINES
TERREBONNE
US-90
SCALE IN MILES
0 5 10 20 30 40

FIGURE 10 - Major Highways, Completed or Under Construction, Southern Louisiana Study Area.

REGIONAL GOVERNMENTAL ORGANIZATION

Regional Councils and Planning Organizations

Councils of Government (COG's) have been formed and operating in the New Orleans area and the Baton Rouge area in Southern Louisiana. Additionally, COG's have been formed in Shreveport and Monroe.

The Regional Planning Commission for Jefferson, Orleans, and St. Bernard Parishes was organized in 1962 as a body of private citizens appointed by the participating governments. In 1966, it was reorganized to include the chief elected officials of each Parish, with provision for direct representation of the five municipalities within Jefferson Parish.

The Commission has a staff of seven persons, and is assisted by a Technical Advisory Committee, composed of the three Parish Planning Directors. Activities of the Commission include production of a five-volume Study Design in 1966 containing the necessary elements of a comprehensive plan and designed to produce specific plans and general development policies for the region. A four-year work program based on the Study Design is now underway. The Commission is the official agency in the New Orleans region for review and comment on Federal grant applications; it has participated in the Model Cities project and the New Orleans - Airport Rapid Transit Study.

The Capital Region Planning Commission (CRPC) is the principal planning agency for a ten-parish region including East Baton Rouge Parish and nine surrounding parishes (Pointe Coupee, West Feliciana, East Feliciana, St. Helena, Tangipahoa, West Baton Rouge, Livingston, Ascension, and Iberville). CRPC was formed in July of 1967, has a professional staff of three, and is financed by a per capita assessment plus matching Federal funds. CRPC is presently engaged in the development of a Comprehensive Plan, with some thirty-seven studies and reports published or in process. Development is underway on a regional Data Center and an Information Center on Government Assistance Programs. CRPC is the designated Federal assistance review agency for the ten-parish area. In addition to publishing a regular newsletter and special reports and position papers, the CRPC has completed, with the Louisiana Department of Highways and the U. S. Bureau of Public Roads, a Metropolitan Area Transportation Study. A member of the CRPC Executive Committee is also a member of the Comprehensive Health Planning [314(b)] agency and chairs a joint health planning group within the region. Planning for law enforcement is separate. The 314 (b) agency has established an environmental committee which is studying air pollution.

Other regional planning commissions in Southern Louisiana are the Lafayette Regional Planning Commission, Lafayette Parish, and the Calcasieu Regional Planning Commission at Lake Charles.

Economic Development Districts have been formed which include all of Southern Louisiana outside the New Orleans SMSA: the Evangeline EDD Council at Lafayette, the Kisatchie-Delta EDD Council at Alexandria (which includes three parishes north of the study region boundary), and the Capital EDD Council, which includes an area similar to CRPC in Baton Rouge.

Parish planning commissions are established in St. Landry, Lafayette, St. Martin, Iberville, East Baton Rouge, West Baton Rouge, Ascension, St. James, St. John the Baptist, St. Charles, Terrebonne, Jefferson, Orleans (New Orleans City), and St. Bernard Parishes (Figure 11).

Air Pollution Control Activities

The Louisiana Air Pollution Control Act (Act 259 of the 1964 legislature) pre-empts all authority for air pollution control within the State. It created the Louisiana Air Control Commission chaired by the State Health Officer, and expressly stated, "this law shall be the exclusive means within the State for the control of air pollution." There are, therefore, no local air pollution control programs operating within the State. The Act does provide, however, that it shall not be construed "to prevent private actions to abate nuisances under existing laws."

The Louisiana Air Control Commission, under a Technical Secretary, has fourteen positions budgeted. Additionally, Health

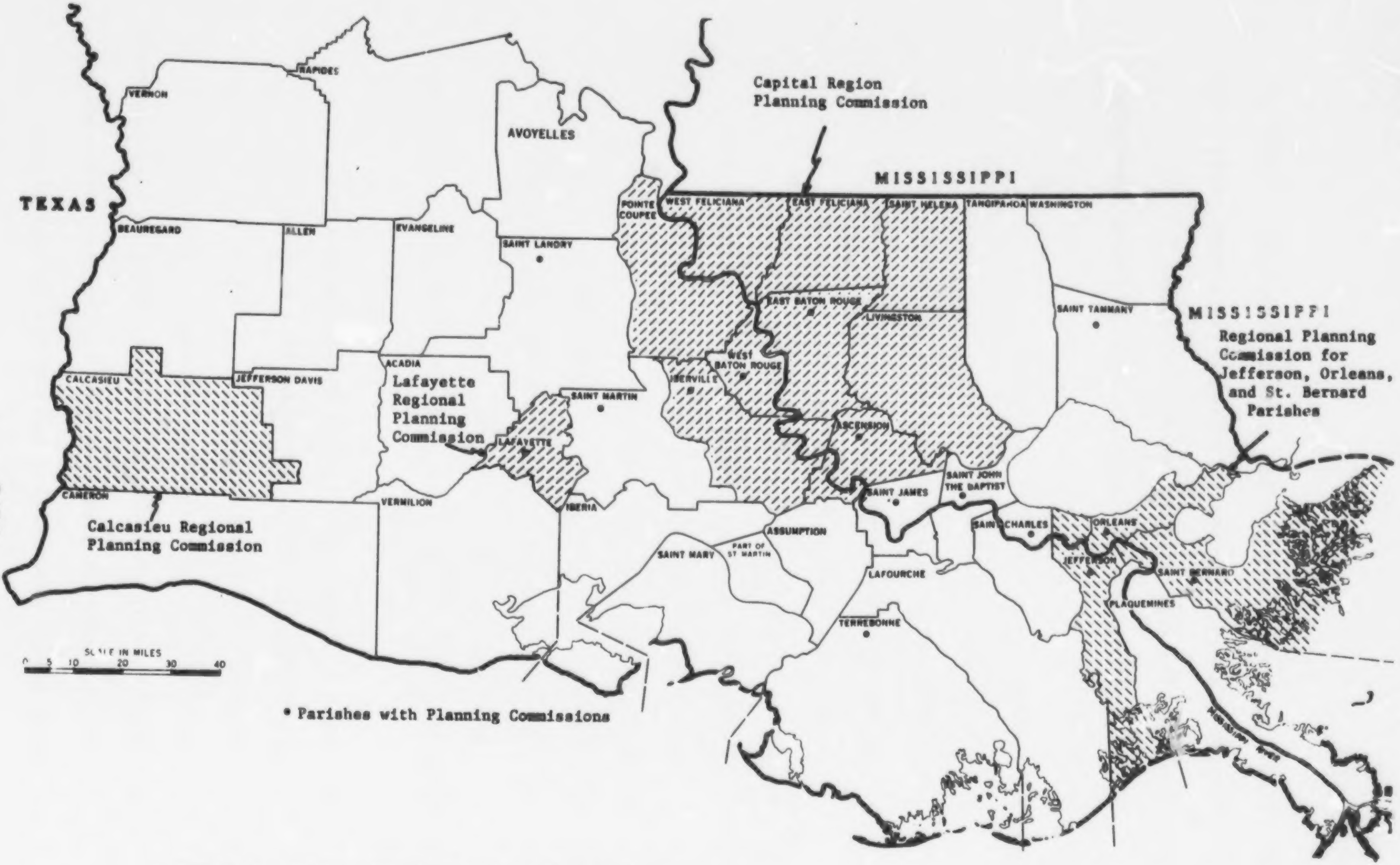

Capital Region
Planning Commission
MISSISSIPPI
MISSISSIPPI
Regional Planning
Commission for
Jefferson, Orleans,
and St. Bernard
Parishes
TEXAS
Lafayette
Regional
Planning
Commission
Calcasieu Regional
Planning Commission
VERNON
RAPIDES
AVOYELLES
BEAUREGARD
ALLEN
EVANGELINE
SAINT LANDRY
POINTE COUPEE
WEST FELICIANA
EAST FELICIANA
SAINT HELENA
TANGIPAHOA
WASHINGTON
SAINT TAMMANY
EAST BATON ROUGE
LIVINGSTON
WEST BATON ROUGE
IBERVILLE
ASCENSION
SAINT JAMES
SAINT JOHN THE BAPTIST
SAINT CHARLES
ORLEANS
JEFFERSON
SAINT BERNARD
PLAQUEMINES
CALCASIEU
JEFFERSON DAVIS
ACADIA
LAFAYETTE
SAINT MARTIN
CAMERON
VERMILION
IBERIA
SAINT MARY
PART OF ST MARTIN
ASSUMPTION
LAFOURCHE
TERREBONNE
MISSISSIPPI RIVER
SCALE IN MILES
0 5 10 20 30 40
• Parishes with Planning Commissions

FIGURE 11 - Southern Louisiana Regional Planning Agencies

Source: U. S. Department of Commerce, Economic Development Administration.

Department sanitarians may provide certain assistance. Under an agreement with the New Orleans City Health Department, additional program assistance will be provided in that city.

The 1970 Air Control Plan provides the following immediate objectives:

1. Adoption of sulfur oxide standards.
2. A permit or registration system.
3. Investigation or enforcement programs in
   a) the New Orleans-Baton Rouge corridor;
   b) Westlake-Lake Charles area; and
   c) New Orleans metropolitan area.
4. Adoption of emission standards for dust, suspended particulates, and sulfur compounds.
5. Incinerator standards revision.
6. Reduction of open burning by 50 percent.
7. Further efforts to control automobile anti-pollution device performance.

Long-range objectives of the 1970 Louisiana Air Control Plan include:

1. Completion of studies in all metropolitan areas.
2. The elimination of open burning with permissive exceptions in special cases.
3. Establishment of additional ambient air standards.
4. Completion of a statewide inventory and plan implementation for abatement of pollution from cotton gins, sugar mills, rice mills, paper mills, and hot mix asphalt plants.

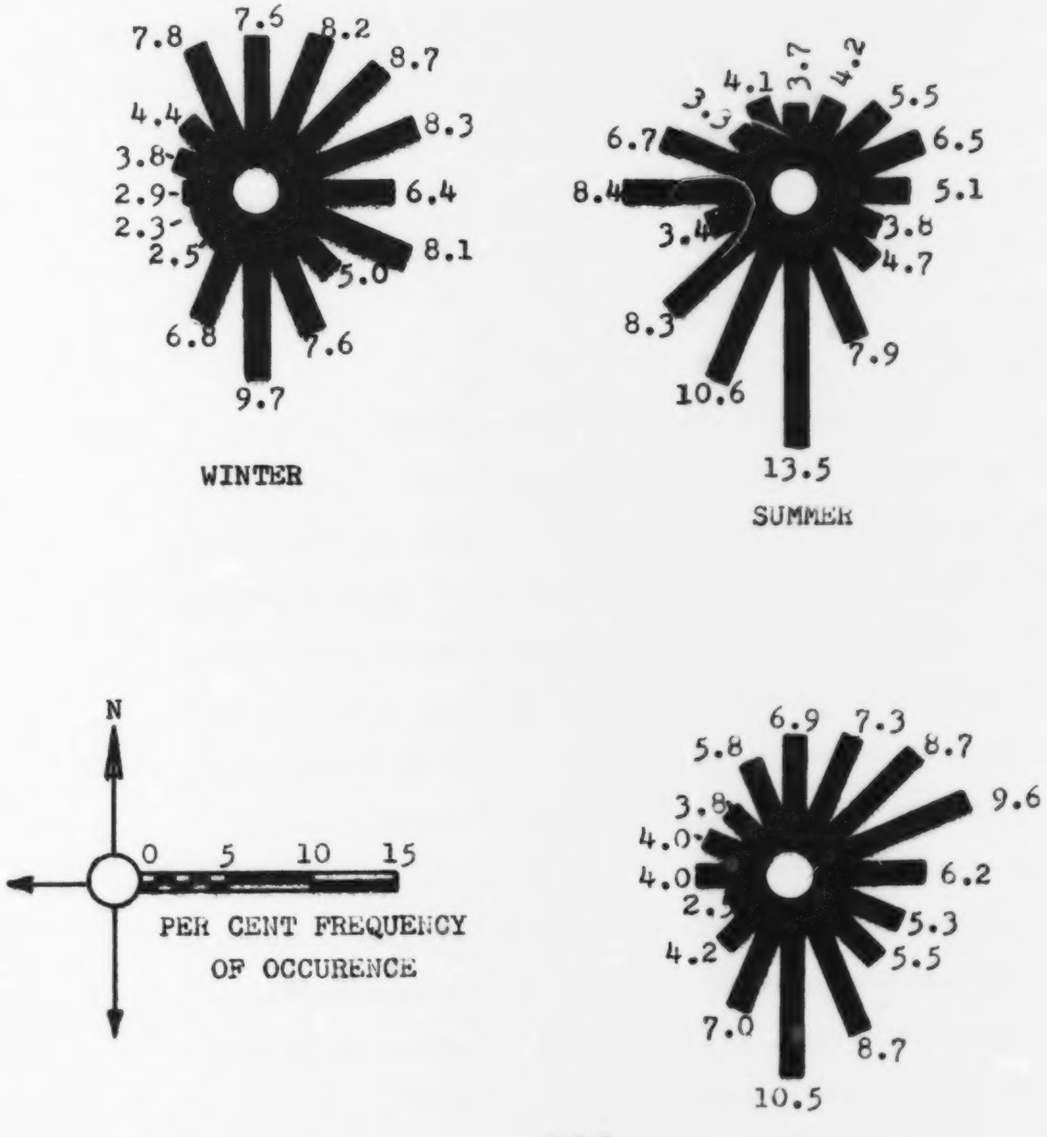
EVALUATION OF ENGINEERING FACTORS

Three major engineering factors were evaluated in the Southern Louisiana study area to assist in determining the geographical extent of the Louisiana portion of the proposed Southern Louisiana-Southeastern Texas Air Quality Control Region. They were meteorology, distribution of air pollutant emissions, and measured ambient air quality data. Although a diffusion model was developed to determine the theoretical air quality levels and patterns, it is not included in this analysis as it used input data from only six of the thirty-eight parishes. Examination of these three engineering factors led to the basic conclusions on the size of the region.

METEOROLOGY

Wind direction, when evaluated along with the topography of an area, is the most important single factor to consider in examining the meteorological influence upon air pollution in an area. Figure 12 shows the annual, winter, and summer wind roses for the New Orleans area. It can be seen that the predominant wind direction throughout the year is from the south. This has the beneficial aspect of carrying much of the New Orleans area pollution over Lake Pontchartrain and other sparsely settled areas. During the winter the wind is primarily from the northeast and southeast quadrants while summer winds have high frequenceis from the west and southwest. Topography, discussed earlier in the Urban Factors section, has little or no effect on the area because of its flat character.

FIGURE 12. PER CENT FREQUENCY OF WIND DIRECTION (NEW ORLEANS)



WINTER

SUMMER

PER CENT FREQUENCY OF OCCURENCE

ANNUAL

EMISSION INVENTORY

The most extensive and important engineering factor evaluated in this study was an emission inventory which showed the geographical distribution and present levels of air pollutant emissions within the 38-parish study area. Two separate emission inventories were conducted by the National Air Pollution Control Administration in Southern Louisiana. With the cooperation of the Louisiana State Department of Health, existing reports were used to estimate the quantity of pollutants in each of these survey areas.

The first survey involved using the Rapid Survey Technique* to determine, on a grid zone basis, the emissions from a 6-parish area that included Jefferson, Orleans, St. Bernard, St. Charles, St. John the Baptist, and St. Tammany parishes. In the rapid survey technique, the major pollutant emitters are evaluated individually while the remaining multitude of sources are considered collectively as area or grid zone sources. The results of this study are reported in the New Orleans Metropolitan Area Air Pollutant Emission Inventory, October, 1969. The second emission inventory examined the remaining 32 parishes of the Southern Louisiana study area and reported emissions by parish totals. A summary of the major findings of these two emission inventories is included in the following section of this report.

The emission inventories conducted by the National Air Pollution Control Administration were based on 1968 data and included five pollutants--particulates, sulfur oxides, carbon monoxide, hydrocarbons, and nitrogen oxides. Only particulates, sulfur oxides, and carbon monoxide are considered in the report.

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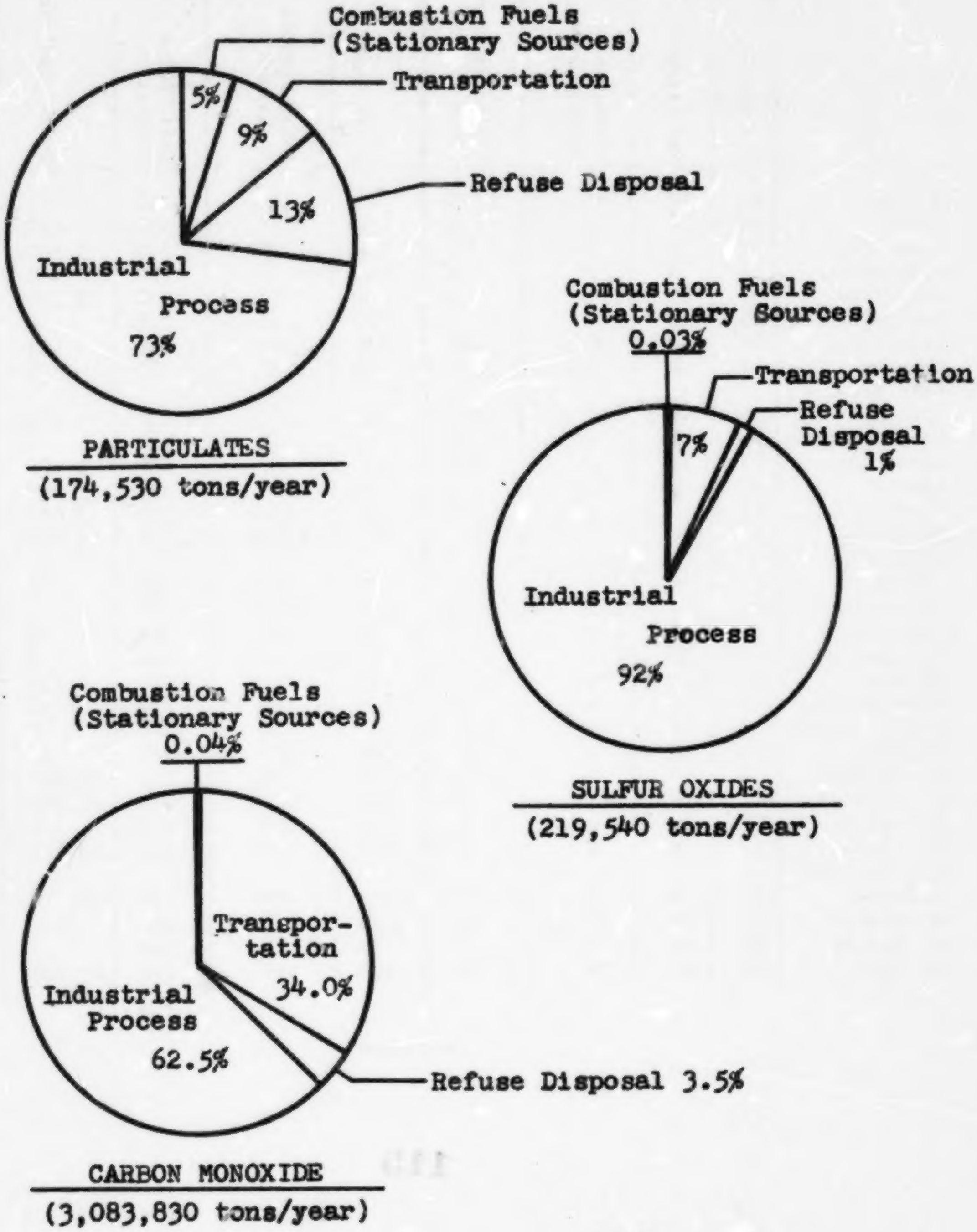
*Ozolins, G. and Smith, R., Rapid Survey Technique for Estimating Community Air Pollution Emissions. U. S. DEHW, Division of Air Pollution, October 1966.

Figure 13 graphically portrays the total 38-parish study area emissions by the percent contribution of the various source categories. It is obvious that emissions from industrial process losses are the greatest contributors of pollution in the study area. For each of the three pollutants examined, over half the total contribution are from these activities. The second most important pollution source (for particulates) is refuse disposal, and transportation for sulfur oxides and carbon monoxide. The Southern Louisiana area is one of the few regions of the nation where the automobile is not the major contributor of carbon monoxide. Since natural gas is the major fuel used in the area, pollutant emissions from fuel combustion are negligible.

Tables 5, 6, and 7 show the emission distribution of each of the three pollutants by source category within each of the 38-parishes. All values are in tons per year of the specific pollutant. In the parishes located within the Baton Rouge and New Orleans metropolitan areas the figure for emissions from motor vehicles also includes aircraft, railroads, and vessels. Figures 14, 15, and 16 portray the data shown in these tables.

Particulate emission totals are greatest in the parishes along the New Orleans to Baton Rouge industrial corridor with the exception of high values resulting from industrial process

FIGURE 13. TOTAL STUDY AREA EMISSIONS BY PER CENT CONTRIBUTION OF VARIOUS SOURCE CATEGORIES, 1968.



PARTICULATES
(174,530 tons/year)

SULFUR OXIDES
(219,540 tons/year)

CARBON MONOXIDE
(3,083,830 tons/year)

TABLE 5. PARTICULATE EMISSIONS BY SOURCE CATEGORY AND POLITICAL, JURISDICTION IN SOUTHERN LOUISIANA, 1968 (TONS/YEAR).

County	Emissions from Fuel Consumption					Motor Vehicle Emissions	Solid Waste Disposal	Industrial Processes	Total Emissions (All Sources)
	Industrial	Residential	Commercial & Institutional	Steam-Electric Power Plants	Total Fuel				
Acadia	60	10	10	0	80	120	560	0	760
Allen	50	N	N	0	50	80	230	150	410
Ascension	330	10	N	0	340	150*	370	4,880	5,740
Assumption	20	N	N	0	20	30	210	0	260
Avoyelles	50	10	N	0	60	90	430	2,200	2,780
Beauregard	30	N	N	0	30	60	220	0	310
Calcasieu	410	30	20	190	650	540	1,050	5,650	7,890
Cameron	10	N	N	0	10	40	40	0	90
East Baton Rouge	830	50	30	100	1,010	1,770*	3,220	21,260	27,280
East Feliciana	20	N	N	0	20	60	230	0	310
Evangeline	40	10	N	130	180	60	360	4,810	5,410
Iberia	60	10	10	0	80	180	310	1,630	2,200
Iberville	310	10	N	220	540	220*	350	3,000	4,110
Jefferson	150	60	20	120	350	3,240*	1,790	6,770	12,150
Jefferson Davis	40	10	N	0	50	90	360	0	500
Lafayette	100	20	10	30	160	370	470	0	1,000
Lafourche	70	10	10	0	90	190	680	0	960
Livingston	30	10	N	0	40	90	320	0	450
Orleans	240	140	50	310	740	3,760*	5,210	7,230	16,940
Plaquemines	40	10	N	0	50	60	290	500	900
Pointe Coupee	30	10	N	0	40	60	260	0	360
Rapides	130	20	N	20	180	390	1,260	10	1,840
St. Bernard	580	10	N	0	590	530*	160	11,800	13,080
St. Charles	290	N	N	0	290	1,200*	120	15,930	17,540
St. Helena	10	N	N	0	10	10	100	0	120
St. James	210	N	N	0	210	170*	220	10,310	10,910
St. John the Baptist	120	N	N	0	120	1,000*	100	4,570	5,790
St. Landry	100	20	10	0	130	250	620	0	1,000
St. Martin	40	10	N	0	50	50	340	0	440
St. Mary	70	10	10	30	120	190	450	17,100	17,860

continued

TABLE 5, Continued.

County	Emissions from Fuel Consumption					Motor Vehicle Emissions	Solid Waste Disposal	Industrial Processes	Total Emissions (All Sources)
	Industrial	Residential	Commercial & Institutional	Steam-Electric Power Plants	Total Fuel				
St. Tammany	N	10	N	0	10	210*	160	1,000	1,380
Tangipahoa	70	10	10	0	90	190	690	0	970
Terrebonne	90	20	10	0	120	220	760	0	1,100
Vermilion	50	10	N	0	60	110	430	0	600
Vernon	20	N	N	0	20	80	210	0	310
Washington	50	10	N	0	60	140	490	2,600	3,290
West Baton Rouge	10	N	N	0	10	290*	140	4,200	4,640
West Feliciana	20	N	N	0	20	30	140	2,600	2,790
Southern Louisiana TOTALS	4,780	540	210	1,150	6,680	16,320*	23,330	128,200	174,530

N= Negligible

*. Includes emission from all transportation sources

TABLE 6. SULFUR OXIDE EMISSIONS BY SOURCE CATEGORY AND POLITICAL JURISDICTION IN SOUTHERN LOUISIANA, 1968 (TONS/YEAR).

County	Emissions From Fuel Consumption			Motor Vehicle Emissions	Solid Waste Disposal	Industrial Processes	Total Emissions (All Sources)
	Industrial	Steam-Electric Power Plants	Total Fuel				
Acadia	N	0	N	80	40	0	120
Allen	N	0	N	50	10	0	60
Ascension	N	0	N	200*	30	0	230
Assumption	N	0	N	20	10	0	30
Avoyelles	N	0	N	50	30	0	80
Beauregard	N	0	N	40	10	0	50
Calcasieu	10	10	20	340	80	17,900	18,340
Cameron	N	0	N	30	N	0	30
East Baton Rouge	N	N	N	1,930*	210	38,300	40,440
East Feliciana	N	0	N	50	10	0	60
Evangeline	N	N	N	50	30	0	80
Iberia	N	0	N	100	20	4,000	4,120
Iberville	N	10	10	380*	20	30,000	30,410
Jefferson	N	N	N	2,930*	200	11,000	14,130
Jefferson Davis	N	0	N	60	30	420	510
Lafayette	N	N	N	230	40	0	270
LaFourche	N	0	N	110	50	0	160
Livingston	N	0	N	50	30	0	80
Orleans	10	20	30	3,870*	420	0	4,320
Plaquemines	N	0	N	40	30	5,600	5,670
Pointe Coupee	N	0	N	40	10	0	50
Rapides	N	N	N	240	90	0	330
St. Bernard	10	0	10	640*	20	16,600	17,270
St. Charles	10	0	10	1,600*	10	28,700	30,320
St. Helena	N	0	N	10	10	0	20
St. James	N	0	N	350*	20	47,000	47,370
St. John the Baptist	N	0	N	1,330*	10	100	1,440
St. Landry	N	0	N	150	50	0	200
St. Martin	N	0	N	30	30	0	60
St. Mary	N	N	N	120	30	0	150

continued

TABLE 6, Continued.

County	Emissions From Fuel Consumption			Motor Vehicle Emissions	Solid Waste Disposal	Industrial Processes	Total Emissions (All Sources)
	Industrial	Steam-Electric Power Plants	Total Fuel				
St. Tammany	N	0	N	120*	20	0	140
Tangipahoa	N	0	N	110	50	0	160
Terrebonne	N	0	N	130	50	0	180
Vermilion	N	0	N	60	30	0	90
Vernon	N	0	N	50	10	0	60
Washington	N	0	N	90	40	900	1,030
West Baton Rouge	N	0	N	540*	10	0	550
West Feliciana	N	0	N	20	10	900	930
Southern Louisiana TOTALS	40	40	80	16,240	1,800	201,420	219,540

N= Negligible
*= Includes emissions from all transportation sources

TABLE 7. CARBON MONOXIDE EMISSIONS BY SOURCE CATEGORY AND POLITICAL JURISDICTION IN SOUTHERN LOUISIANA, 1968 (TONS/YEAR).

County	Industrial Fuel Combustion Emissions	Motor Vehicle Emissions		Solid Waste Disposal		Industrial Processes	Total Emissions (All Sources)
		Gasoline-Powered Vehicles	Diesel-Powered Vehicles	Incineration	Open Burning		
Acadia	N	15,740	20	460	2,450	0	18,670
Allen	N	9,880	10	180	990	0	11,060
Ascension	1,100	9,150	540	170	1,580	1,100	12,580*
Assumption	N	4,480	10	170	910	0	5,570
Avoyelles	N	11,460	20	330	1,850	106,000	119,660
Beauregard	N	8,570	10	170	940	0	9,690
Calcasieu	10	71,990	110	1,320	4,000	494,000	571,430
Cameron	N	5,160	10	70	90	0	5,330
East Baton Rouge	N	128,000	7,740	1,670	13,400	186,000	343,910*
East Feliciana	N	8,760	10	180	980	0	9,930
Evangeline	N	8,470	10	290	1,570	232,000	242,340
Iberia	N	23,720	40	440	1,110	5,800	31,110
Iberville	N	8,450	490	240	1,360	6,300	16,910*
Jefferson	N	128,500	2,900	2,500	6,140	11,100	155,190*
Jefferson Davis	N	11,700	20	260	1,500	0	13,480
Lafayette	N	48,120	70	810	1,470	0	50,470
LaFourche	N	23,760	40	530	2,950	0	27,280
Livingston	N	11,390	20	240	1,390	0	13,040
Orleans	10	167,000	4,300	2,500	14,800	0	203,550*
Plaquemines	N	7,780	10	220	460	56,000	64,470
Pointe Coupee	N	7,320	10	200	1,120	0	8,650
Rapides	N	51,360	80	990	5,500	0	57,930
St. Bernard	10	14,750	350	120	640	1,700	17,780*
St. Charles	10	10,100	280	280	480	2,500	14,220*
St. Helena	N	1,440	N	90	460	0	1,990
St. James	N	2,130	140	170	720	4,000	7,230*
St. John the Baptist	N	7,900	200	270	370	0	9,210*
St. Landry	N	32,330	50	750	2,370	0	35,500
St. Martin	N	6,660	10	260	1,500	0	8,430
St. Mary	N	25,140	40	470	1,150	822,000	848,800

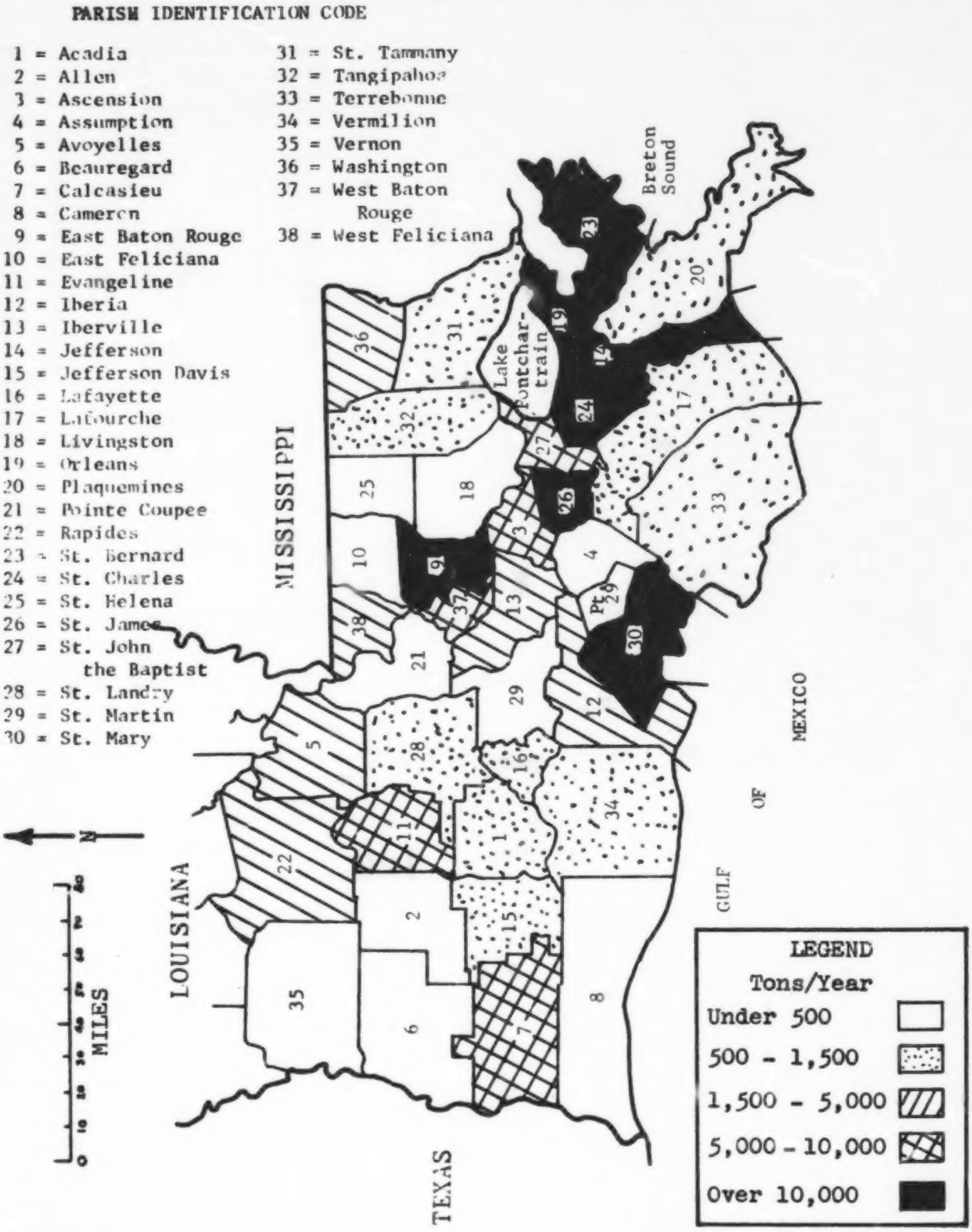
continued

TABLE 7, Continued.

County	Industrial Fuel Combustion Emissions	Motor Vehicle Emissions		Solid Waste Disposal		Industrial Processes	Total Emissions (All Sources)
		Gasoline-Powered Vehicles	Diesel-Powered Vehicles	Incineration	Open Burning		
St. Tammany	N	26,200	520	390	640	0	27,750
Tangipahoa	N	24,710	40	550	2,990	0	28,290
Terrebonne	N	28,570	40	590	3,320	0	32,520
Vermilion	N	13,760	20	350	1,860	0	15,990
Vernon	N	10,700	20	180	900	0	11,800
Washington	N	17,860	30	400	2,160	0	20,450
West Baton Rouge	N	6,400	260	100	540	0	7,420*
West Feliciana	N	3,480	10	110	600	0	4,200
Southern Louisiana TOTALS	1,140	1,047,910*		19,020	87,260	1,928,500	3,083,830*

N= Negligible
*= Includes emissions from all transportation sources

FIGURE 14. ANNUAL PARTICULATE EMISSIONS BY PARISH IN SOUTHERN LOUISIANA STUDY AREA, 1968


PARISH IDENTIFICATION CODE

1 = Acadia
2 = Allen
3 = Ascension
4 = Assumption
5 = Avoyelles
6 = Beauregard
7 = Calcasieu
8 = Cameron
9 = East Baton Rouge
10 = East Feliciana
11 = Evangeline
12 = Iberia
13 = Iberville
14 = Jefferson
15 = Jefferson Davis
16 = Lafayette
17 = Lafourche
18 = Livingston
19 = Orleans
20 = Plaquemines
21 = Pointe Coupee
22 = Rapides
23 = St. Bernard
24 = St. Charles
25 = St. Helena
26 = St. James
27 = St. John the Baptist
28 = St. Landry
29 = St. Martin
30 = St. Mary
31 = St. Tammany
32 = Tangipahoa
33 = Terrebonne
34 = Vermilion
35 = Vernon
36 = Washington
37 = West Baton Rouge
38 = West Feliciana

MISSISSIPPI
LOUISIANA
TEXAS
GULF OF MEXICO
Breton Sound
Lake Pontchartrain
Pt.
N
MILES
LEGEND
Tons/Year
Under 500 ☐
500 - 1,500 ░
1,500 - 5,000 ▨
5,000 - 10,000 ▩
Over 10,000 ■

FIGURE 15. ANNUAL SULFUR OXIDES EMISSIONS BY PARISH IN SOUTHERN LOUISIANA STUDY AREA, 1968.

PARISH IDENTIFICATION CODE

1 = Acadia
2 = Allen
3 = Ascension
4 = Assumption
5 = Avoyelles
6 = Beauregard
7 = Calcasieu
8 = Cameron
9 = East Baton Rouge
10 = East Feliciana
11 = Evangeline
12 = Iberia
13 = Iberville
14 = Jefferson
15 = Jefferson Davis
16 = Lafayette
17 = Lafourche
18 = Livingston
19 = Orleans
20 = Plaquemines
21 = Pointe Coupee
22 = Rapides
23 = St. Bernard
24 = St. Charles
25 = St. Helena
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27 = St. John the Baptist
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33 = Terrebonne
34 = Vermilion
35 = Vernon
36 = Washington
37 = West Baton Rouge
38 = West Feliciana

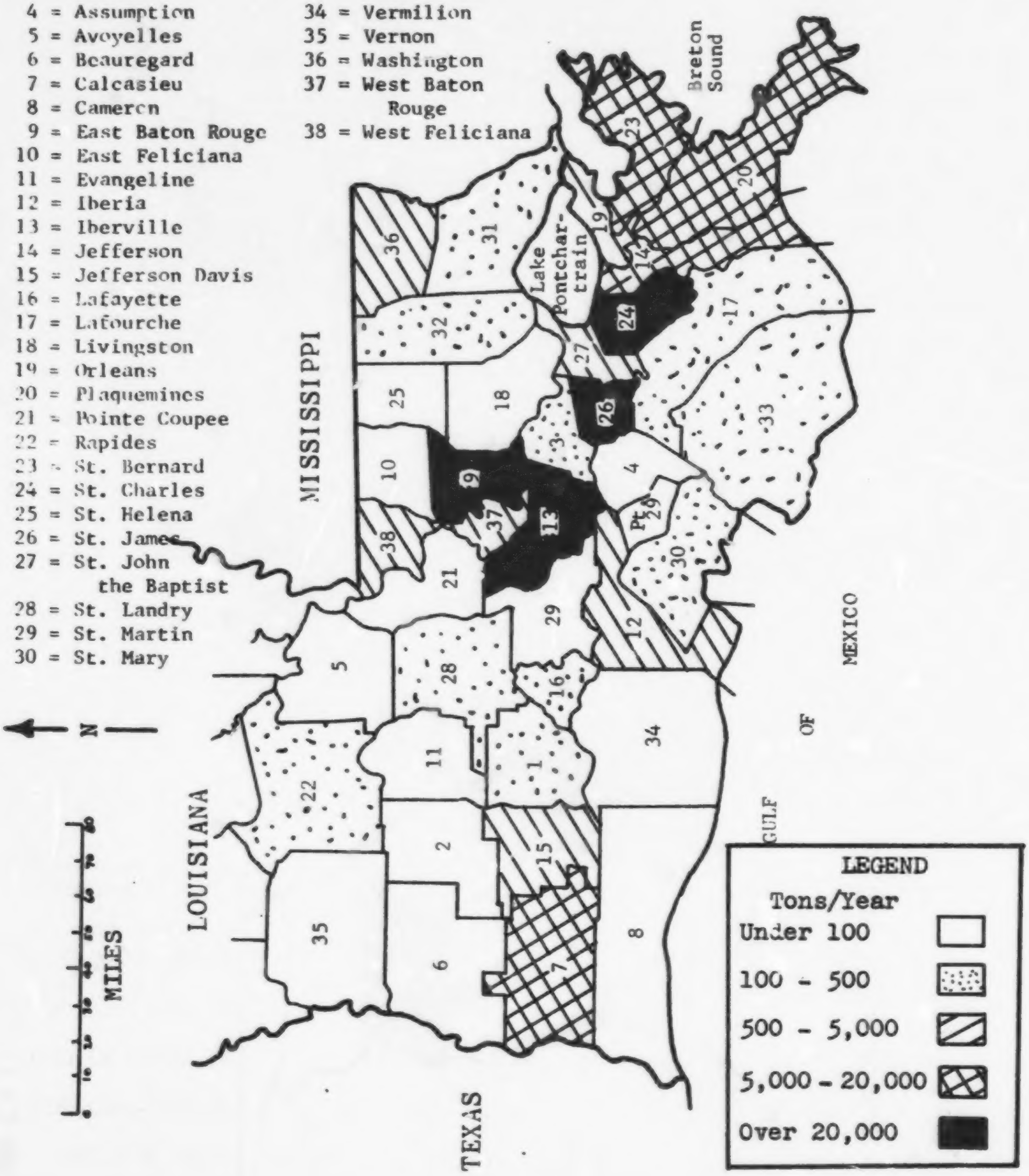
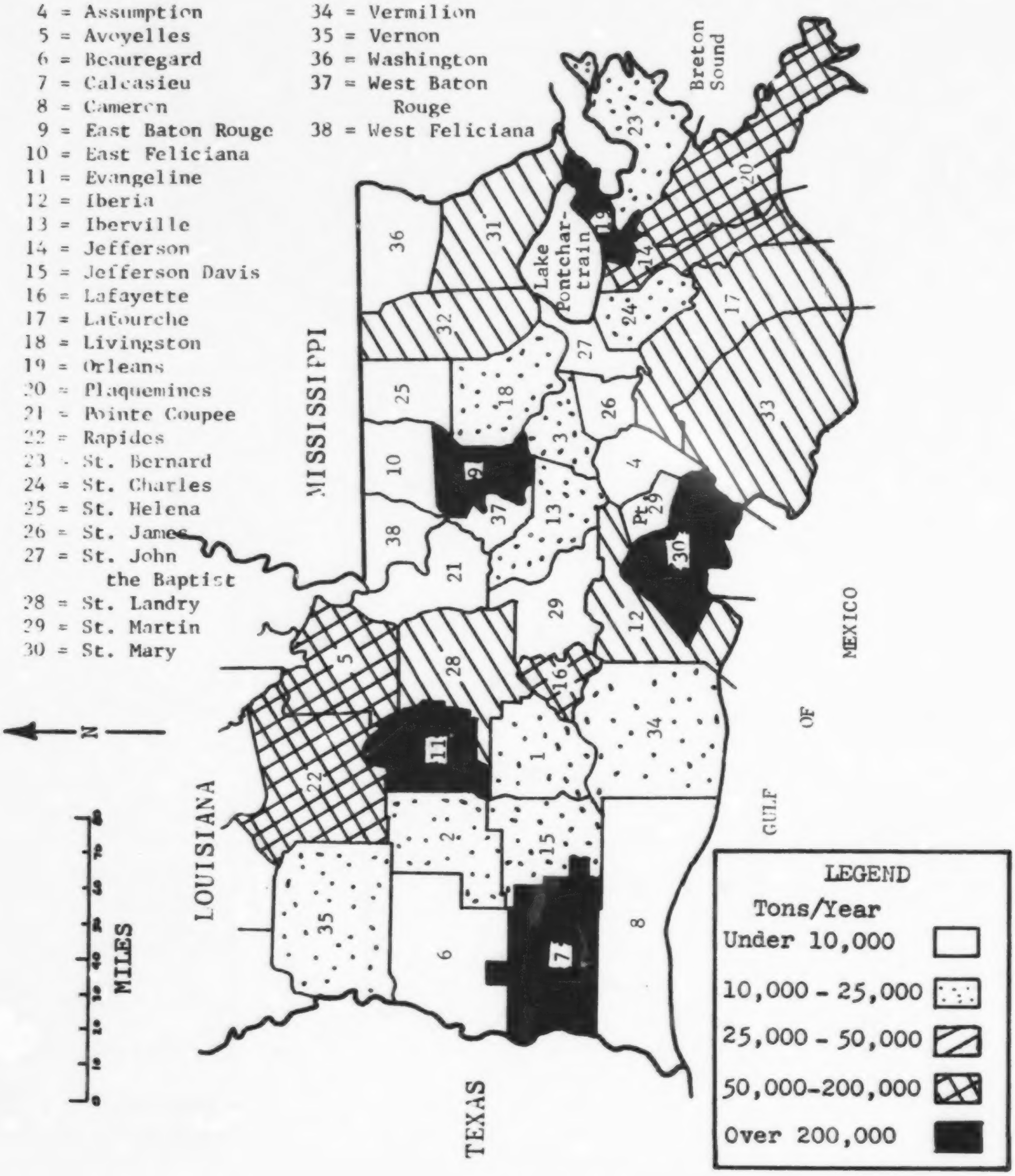

Breton Sound
Lake Pontchartrain
MISSISSIPPI
LOUISIANA
TEXAS
GULF OF MEXICO
N
MILES
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
Pt.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
LEGEND
Tons/Year
Under 100 ☐
100 - 500 ░
500 - 5,000 ▨
5,000 - 20,000 ▩
Over 20,000 ■

FIGURE 16. ANNUAL CARBON MONOXIDE EMISSIONS BY PARISH IN SOUTHERN LOUISIANA STUDY AREA, 1968.

PARISH IDENTIFICATION CODE

1 = Acadia
2 = Allen
3 = Ascension
4 = Assumption
5 = Avoyelles
6 = Beauregard
7 = Calcasieu
8 = Cameron
9 = East Baton Rouge
10 = East Feliciana
11 = Evangeline
12 = Iberia
13 = Iberville
14 = Jefferson
15 = Jefferson Davis
16 = Lafayette
17 = Lafourche
18 = Livingston
19 = Orleans
20 = Plaquemines
21 = Pointe Coupee
22 = Rapides
23 = St. Bernard
24 = St. Charles
25 = St. Helena
26 = St. James
27 = St. John the Baptist
28 = St. Landry
29 = St. Martin
30 = St. Mary
31 = St. Tammany
32 = Tangipahoa
33 = Terrebonne
34 = Vermilion
35 = Vernon
36 = Washington
37 = West Baton Rouge
38 = West Feliciana


Breton Sound
Lake Pontchartrain
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38
Pt.
LEGEND
Tons/Year
Under 10,000
10,000 - 25,000
25,000 - 50,000
50,000-200,000
Over 200,000

losses in St. Mary, Evangeline, and Calcasieu parishes. The highest total for an individual parish is in East Baton Rouge with a 1968 annual total of 27,280 tons. Emission densities are highest in Orleans (6.9 tons/square mile/month), St. Charles (5.1), and East Baton Rouge (5.0). Lowest densities were in Cameron (0.005 tons/square mile/month), Vernon (0.019), and St. Helena (0.024). It is important to note that pollutant emissions are spread throughout the study area rather than concentrated in the major population centers.

Sulfur oxide emission totals are highest in the Baton Rouge and lower Mississippi River industrial areas. Other areas having relatively high totals include New Orleans and Lake Charles. St. James parish has the highest annual sulfur oxide emission total, 47,370 tons. Emission densities are highest in St. James (15.6 tons/square mile/month), St. Charles (8.8), and East Baton Rouge (7.4). Lowest densities were found in Beauregard (0.035 tons/square mile/month), and St. Helena (0.004).

Carbon monoxide emissions are highest in five widely separated parishes. Over one-fourth of all study area carbon monoxide emissions come from industrial process losses in one parish--St. Mary. The major source of these emissions are several carbon black plants. Evangeline Parish also has very high carbon monoxide emissions resulting from the same problem. The three other parishes having over 200,000 tons per year carbon monoxide emissions are Calcasieu, East Baton Rouge, and Orleans. In only the latter parish is the motor vehicle the major contributor. Parish emission densities are highest in St. Mary (113 tons/square mile/year), Orleans (83), East Baton Rouge (62), and Calcasieu (43). Lowest emission densities were found in Cameron (0.3 tons/square mile/year) and St. Helena (0.4).

The approximate location of the major point sources within the study area are shown in Figures 17 and 18. Twelve steam-electric plants were operating within the study area during 1968. The predominant use of natural gas for fuel, however, caused these power plants to be negligible contributors to total emission in the area. Major sources of aircraft emissions were Moisant and Lakefront airports in New Orleans, and airports in Baton Rouge, Lake Charles, Lafayette, and Alexandria.

Since the industrial composition of the study area is described extensively in the urban factors portion of this report, only a brief summary of the types of industrial point sources is given in this section. The following table gives the total number of major plants in each industrial category (Not all of these plants are shown on the point source maps).

Number of Plants	Type of Industrial Activity
7	Carbon Black plants
2	Cement plants
88	Cotton Gins
13	Fertilizer plants
65	Grain Elevators
8	Gray and ductile iron foundaries
4	Kraft Pulp Mills

FIGURE 17. APPROXIMATE LOCATION OF MAJOR POINT SOURCES, SOUTHERN LOUISIANA STUDY AREA.

PARISH IDENTIFICATION CODE

1 = Acadia
2 = Allen
3 = Ascension
4 = Assumption
5 = Avoyelles
6 = Beauregard
7 = Calcasieu
8 = Cameron
9 = East Baton Rouge
10 = East Feliciana
11 = Evangeline
12 = Iberia
13 = Iberville
14 = Jefferson
15 = Jefferson Davis
16 = Lafayette
17 = Lafourche
18 = Livingston
19 = Orleans
20 = Plaquemines
21 = Pointe Coupee
22 = Rapides
23 = St. Bernard
24 = St. Charles
25 = St. Helena
26 = St. James
27 = St. John the Baptist
28 = St. Landry
29 = St. Martin
30 = St. Mary
31 = St. Tammany
32 = Tangipahoa
33 = Terrebonne
34 = Vermilion
35 = Vernon
36 = Washington
37 = West Baton Rouge
38 = West Feliciana

NOTE: **Cross-hatched area shown in detail in Figure 18.**

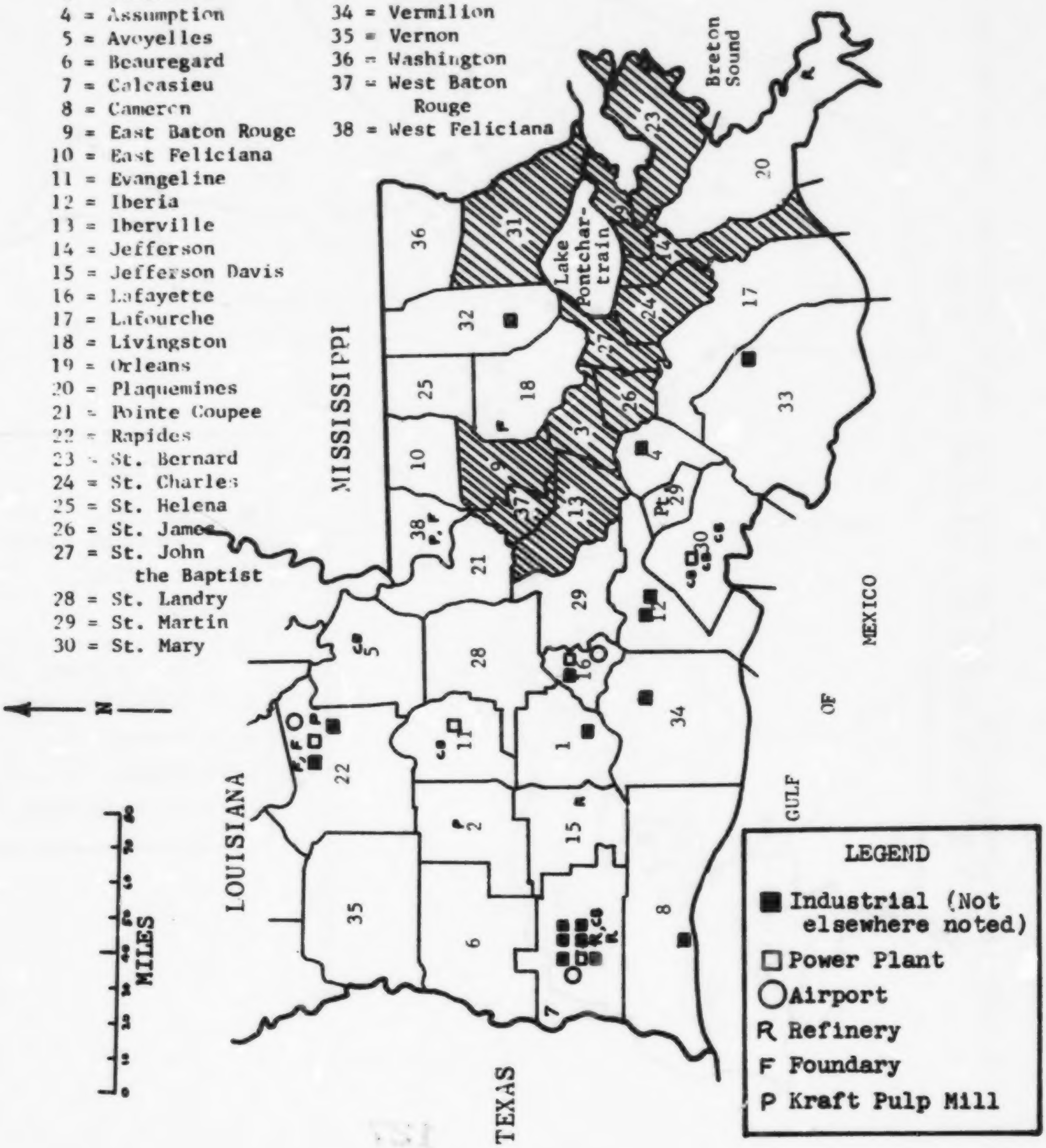
MISSISSIPPI
LOUISIANA
TEXAS
Breton Sound
Lake Pontchartrain
GULF OF MEXICO
N
MILES
0
10
20
30
40
50
60
70
80
LEGEND
■ Industrial (Not elsewhere noted)
□ Power Plant
○ Airport
R Refinery
F Foundary
P Kraft Pulp Mill
1
2
3
4
5
6
7
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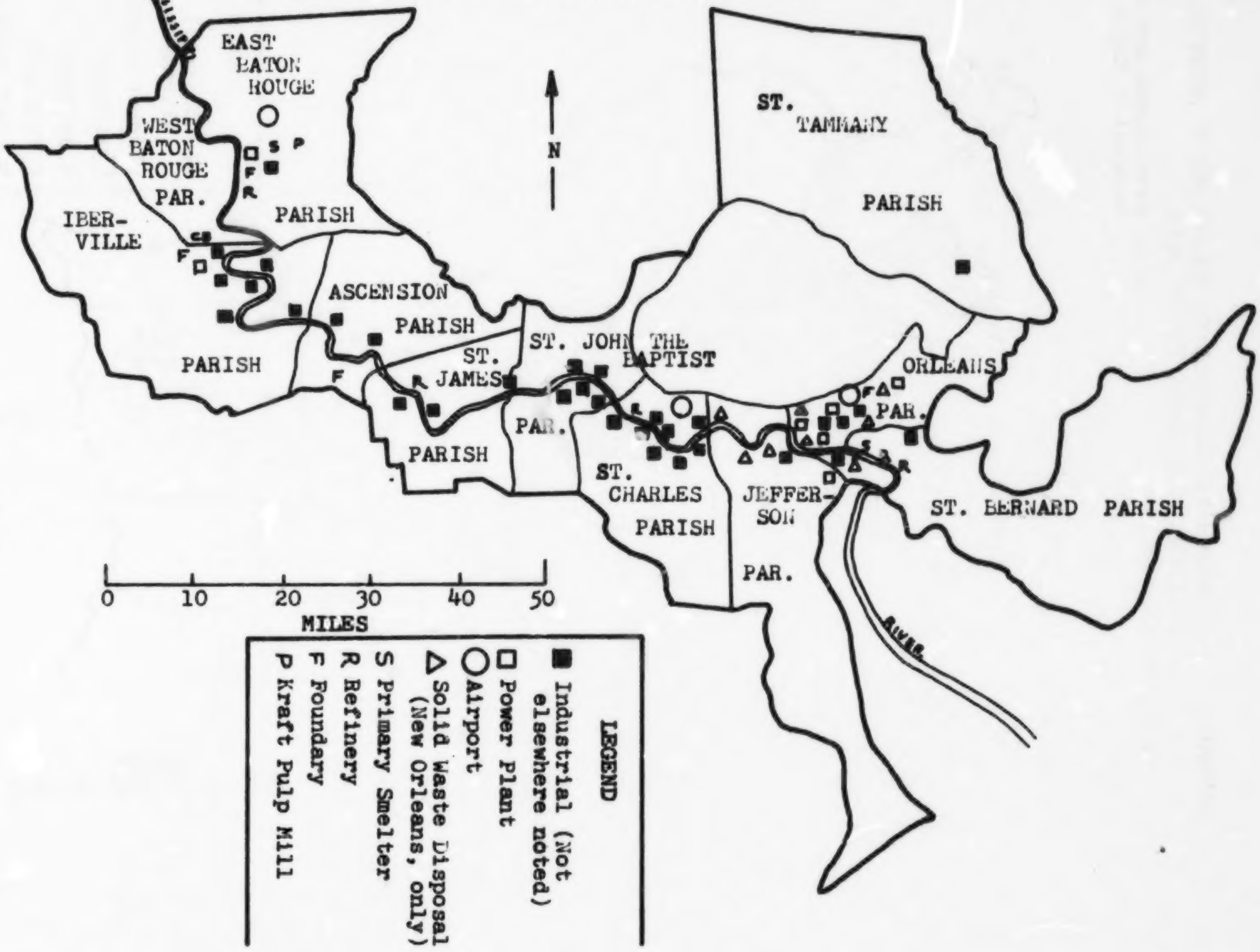
FIGURE 18. APPROXIMATE LOCATION OF MAJOR POINT SOURCES, BATON ROUGE - NEW ORLEANS PORTION OF SOUTHERN LOUISIANA STUDY AREA.


EAST BATON ROUGE PARISH
WEST BATON ROUGE PAR.
IBERVILLE PARISH
ASCENSION PARISH
ST. JAMES PARISH
ST. JOHN THE BAPTIST PAR.
ST. CHARLES PARISH
JEFFERSON PAR.
ORLEANS PAR.
ST. BERNARD PARISH
ST. TAMMANY PARISH
MISSISSIPPI
RIVER
N
0
10
20
30
40
50
MILES
LEGEND
■ Industrial (Not elsewhere noted)
□ Power Plant
○ Airport
△ Solid Waste Disposal (New Orleans, only)
S Primary Smelter
R Refinery
F Foundary
P Kraft Pulp Mill

Number of Plants	Type of Industrial Activity
3	Nitric Acid plants
9	Petroleum Refineries
4	Phosphoric Acid plants
1	Primary Aluminum Reduction plants
1	Primary Lead Smelter and Refinery
41	Rendering plants
8	Sulfuric Acid plants

AIR QUALITY ANALYSIS

The regional approach to air resource management requires that all the major sources of pollution in an area be located within the same air quality control region. One must also consider the influence of pollution upon the people and property once it is emitted into the ambient air. Upon determining this, a region which will envelop nearly all the sources and receptors for a particular area may be selected. Although reliable measured air sampling data for the Southern Louisiana study area is limited, the distribution of pollution emissions over such a large area and the high densities calculated for several parishes indicate that the region boundaries will necessarily contain a very large land area.

The following table gives suspended particulate values for various cities within the Southern Louisiana study area.

City	Year	Geometric Mean (micrograms per cubic meter)
New Orleans (National Air Sampling Network)	1957	101
	1960	85
	1963	91
	1966	82
	1968	86

City	Year	Geometric Mean (micrograms per cubic meter)
Baton Rouge (NASN)	1957	157
	1960	113
	1962	124
	1965	86
(1968-LSDH)	1968	103
Lake Charles (NASN)	1962	76
	1964	63
(1968-LSDH)	1968	39
Lafayette (LSDH)	1966	144
	1968	88

Daily gaseous data at the New Orleans station ranged as follows: Sulfur dioxide, 3 to 49 $\mu g/m^3$; Nitrogen dioxide, 17 to 279 $\mu g/m^3$; Aldehyde, 2 to 23 $\mu g/m^3$; Ammonia, 29 to 69 $\mu g/m^3$; and total Oxidant, 5 to 43 $\mu g/m^3$.

Gaseous data was also available for a station located at the U. S. Public Health Service Hospital near Carville (Iberville Parish). The daily values ranged as follows: Sulfur dioxide, 4 to 44 $\mu g/m^3$; Nitrogen dioxide, 56 to 163 $\mu g/m^3$; Aldehyde, 0 to 22 $\mu g/m^3$; Ammonia, 33 to 101 $\mu g/m^3$; and total Oxidant, 7 to 31 $\mu g/m^3$.

Using emission and meteorological data, a diffusion model can be developed to predict pollutant concentrations and dispersion patterns. This procedure is particularly useful in areas where little air sampling data is available. After developing a diffusion model for the 6-parish New Orleans metropolitan area, analysis of emission data and industrial location patterns revealed that a much larger area must be considered for an accurate evaluation. Rather than rerun the diffusion model with the emission data developed in the Rapid Survey, it was felt that it would be more valuable to run the analysis at a later date during the creation of the Region's implementation plan.

In conclusion, the evaluation of engineering factors show that pollutant emissions are highest in the Baton Rouge to New Orleans corridor but also affect most other parishes to a significant degree. Use of natural gas has kept fuel combustion pollution relatively low compared to other metropolitan areas. Industrial process losses, however, are much higher than the average region. Air sampling data is not sufficient to use in defining the boundaries of the area. Based on emission data and industrial plant locations, all of Southern Louisiana should be treated as one common problem area.

THE RECOMMENDED REGION

Subject to the scheduled consultation, the Secretary, Department of Health, Education, and Welfare, proposes to designate a region in the Southern Louisiana-Southeast Texas area consisting within the State of Louisiana the territory encompassed by the following jurisdictions:

- Acadia Parish
- Allen Parish
- Ascension Parish
- Assumption Parish
- Avoyelles Parish
- Beauregard Parish
- Calcasieu Parish
- Cameron Parish
- East Baton Rouge Parish
- East Feliciana Parish
- Evangeline Parish
- Grant Parish
- Iberia Parish
- Iberville Parish
- Jefferson Parish
- Jefferson Davis Parish
- Lafayette Parish
- Lafourche Parish
- Livingston Parish
- Orleans Parish
- Plaquemines Parish
- Pointe Coupee Parish
- Rapides Parish
- St. Bernard Parish
- St. Charles Parish
- St. Helena Parish
- St. James Parish
- St. John the Baptist Parish
- St. Landry Parish
- St. Martin Parish
- St. Mary Parish
- St. Tammany Parish
- Tangipahoa Parish
- Terrebonne Parish
- Vermilion Parish
- Vernon Parish
- Washington Parish
- West Baton Rouge Parish
- West Feliciana Parish

As so recommended, the Southern Louisiana portion of the proposed Southern Louisiana-Southeast Texas Air Quality Control Region would consist of the territorial area encompassed by the outermost boundaries of the listed jurisdictions. The recommended Region is shown in Figure 19.

DISCUSSION OF THE PROPOSAL

To be successful, an air quality control region should meet

FIGURE 19. PROPOSED BOUNDARIES FOR THE SOUTHERN LOUISIANA PORTION OF THE SOUTHERN LOUISIANA-SOUTHEAST TEXAS AIR QUALITY CONTROL REGION.[67]

PARISH IDENTIFICATION CODE

1 = Acadia
2 = Allen
3 = Ascension
4 = Assumption
5 = Avoyelles
6 = Beauregard
7 = Calcasieu
8 = Cameron
9 = East Baton Rouge
10 = East Feliciana
11 = Evangeline
12 = Iberia
13 = Iberville
14 = Jefferson
15 = Jefferson Davis
16 = Lafayette
17 = Lafourche
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19 = Orleans
20 = Plaquemines
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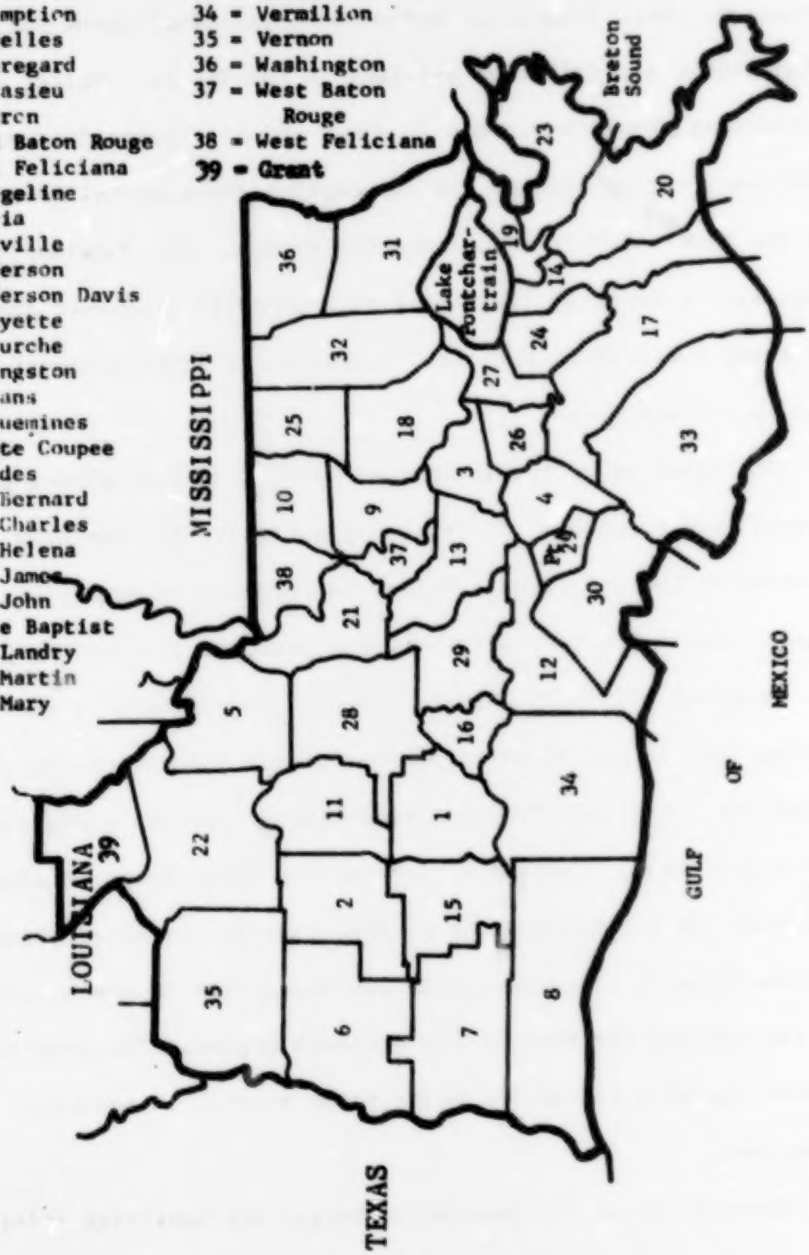
32 = Tangipahoa
33 = Terrebonne
34 = Vermilion
35 = Vernon
36 = Washington
37 = West Baton Rouge
38 = West Feliciana
39 = Grant


Breton Sound
Lake Pontchartrain
MISSISSIPPI
LOUISIANA
TEXAS
GULF OF MEXICO
23
20
19
14
31
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24
17
32
27
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three basic conditions. First, its boundaries should encompass most pollution sources as well as most people and property affected by those sources. Second, the boundaries should encompass those locations where industrial and residential development will create significant air pollution problems in the future. Third, the boundaries should be chosen in a way which is compatible with and even fosters unified and cooperative governmental administration of the air resources throughout the region. The "Evaluation of Engineering Factors" (beginning with page 45) discussed the first of these conditions, and the "Evaluation of Urban Factors" (page 1), the second and third.

The first major consideration, that of including most pollution sources and receptors, is generally satisfied by examining the results of the emission inventory and population densities. The maps on pages 57-59 clearly show the problems involved in limiting the proposed region to a smaller area. In addition to the very strong ties in the Baton Rouge-New Orleans industrial corridor, there are relatively high emission within counties along two additional axes. These axes include the Baton Rouge to Alexandria corridor and the Baton Rouge to Lake Charles corridor. Finally, carbon monoxide emission totals are quite high in nearly all of the western parishes of the proposed region. The proposed region includes all of the major point sources in southern Louisiana.

Examination of the population totals and densities point out that most of the receptors (people and property) of the pollution sources are included within the proposed region. The population densities of the six parishes directly outside the northern boundary of the proposed region--Sabine, Natchitoches, Winn, La Salle, Catahoula, and Concordia--are in all cases less than the parish that each borders within the proposed region. Consideration should be given to providing the benefits of the regional approach by including these parishes in one of the two new regions recently announced for future designation in northern Louisiana.

The second major consideration is directed toward future population and industrial expansion. Population growth rates during the past twenty years have been highest in parishes well within the proposed region's outer boundaries. None of the parishes adjacent to the proposed northern boundary or even in the second tier of parishes from this boundary have grown at a greater population growth rate than the State of Louisiana has averaged. However, 16 of the remaining 25 parishes in the proposed region have had a greater percentage growth rate than the State average. As detailed earlier in this report, future population and industrial growth rate projections are limited. Nevertheless, industrial and resultant population expansion has, and appears likely to continue, occurred along the New Orleans-Baton Rouge-Lafayette-Lake Charles corridor. This corridor lies well within the region's boundaries and thus the second consideration is satisfied.

The third objective relates to government administration in the area. Two separate Councils of Government and four regional planning commissions are included in their entirety within the proposed boundaries. Additionally, Economic Development Districts exist in all portions of the proposed region. With one exception, none of these EDD Councils are split by the proposed region's boundaries. The exception is the Kisatchie-Delta EDD Council, which contains three parishes outside the northern boundary of the proposed region. These parishes were not included because of low population densities and few significant emission sources. However, consideration should be given at the Consultation to include these three parishes if warranted to maintain administrative uniformity.

In summary, the 39-parish area proposed for the northern Louisiana portion of the Southern Louisiana-Southeast Texas Air Quality Control Region is considered on the whole to be the most cohesive and yet inclusive area within which an effective regional effort can be mounted to prevent and control air pollution in the southern half of Louisiana.